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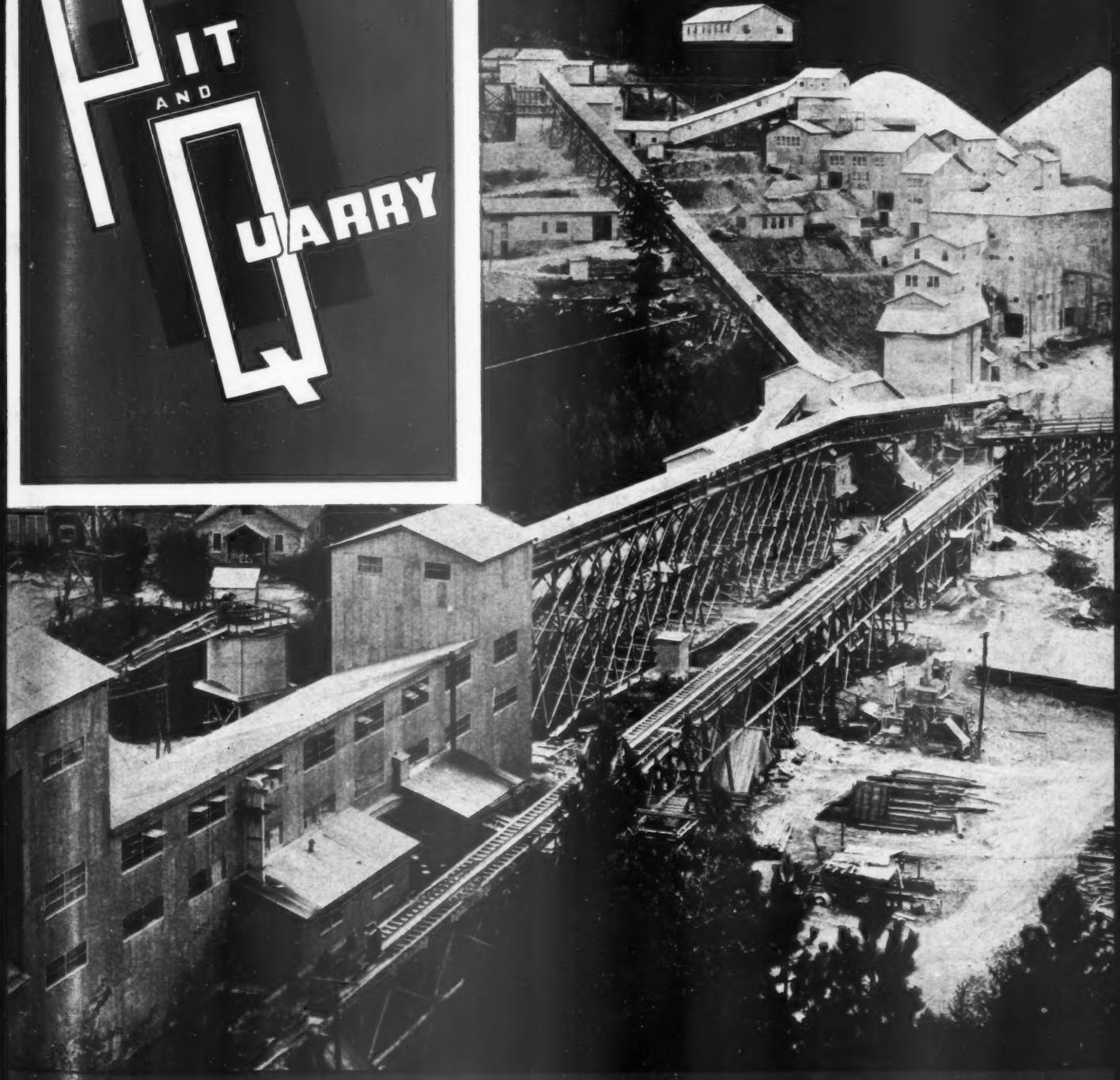
JUNE 1947

PIT AND QUARRY



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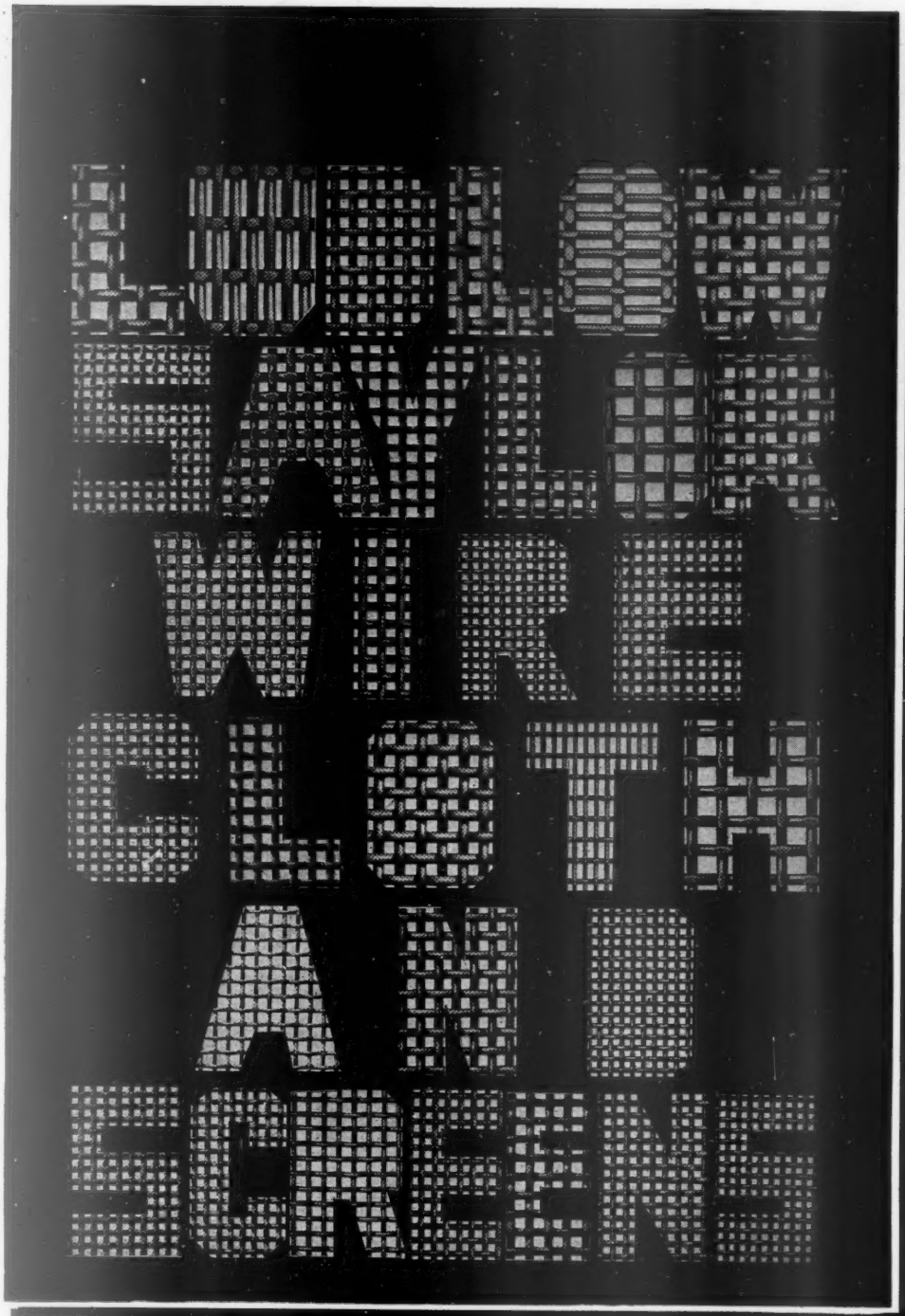
In This Issue

A Circuit Rider Crushing Plant • South Carolina Agstone Unit • 1947 City and Highway Planning • Organizing for Modern Management • Built-in Radiant Heating • Labor Requirements in the Production of Concrete Pipe



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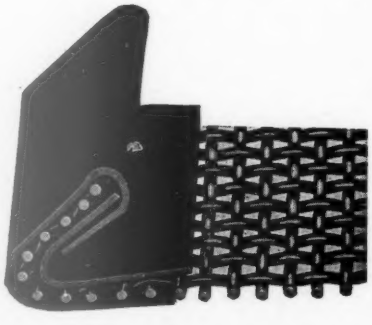

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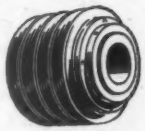

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PIT AND QUARRY

JUNE 1947

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To subscribers: Date on lower right-hand corner of envelope indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address.

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other nonmetallic minerals. Copyright 1947 by Complete Service Publishing Co., 538 S. Clark Street, Chicago 5, Ill.

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EDITORIAL

Nonmetallic Mineral Producers Hold the Price Line

WHEN President Truman recently appealed to the Nation for lower prices to stop the inflationary spiral which seemed to be gathering momentum, he put the spotlight on a condition which was evident to nearly everyone but which few were doing much about. The response to this appeal reflects a growing recognition in industrial and commercial circles of the need for as much price stability as can be attained under present conditions. The Ford Motor Co. and the International Harvester Co. pointed the way by voluntary price reductions and others are following their example in increasing numbers. It is too much to expect, however, that this example will be widely followed until considerable pressure is brought to bear.

It is now becoming apparent that pressure is being brought to bear in a way that cannot be ignored. This pressure is buyer resistance and it is beginning to affect the demand for nearly everything that is manufactured or produced. In the construction industry this resistance is taking the form of a watchful waiting attitude as prospective builders wait for the leveling off or drop in prices they know is bound to come. As a result industrial building contracts in the first quarter of 1947 are 25 percent below their 1946 dollar volume. Allowing at least 20 percent for higher cost this means an actual decline of 37 percent in industrial construction. The backlog, however, continues to grow rapidly, indicating that the market is there when prices are right and the future becomes more certain.

Industry, it is said, has an unparalleled opportunity to assert the leadership for which it has been clamoring for many years and it can do the country and itself a great service by driving prices down. If it fails in this instance business can be sure that it will be blamed if the stability it predicted with the end of the OPA is not attained. In order to effectively attack inflation the cooperation of labor must be obtained; wage demands must be kept within reason. With one large corporation after another, however, reporting earnings far in excess of a reasonable return on capital it will be impossible to prevent a continuance of labor trouble. If these corporations are pushing up their prices and their profits in anticipation of further wage increases they are defeating their own purposes and insuring such demands and inflation.

WITH nearly everyone in the country from the President on down clamoring for lower prices for everything it may seem a little on the negative side to point out that at least one group of industries has been holding the price line during many years of increasing costs. These are the basic building materials industries producing sand and gravel, crushed stone, lime, cement, etc. In their case at least price rises have been resisted in a manner which is equivalent to price reduction. It is questionable whether the low prices obtaining in these industries and the small increases in prices since the end of price control are due to unusual foresight and business acumen or to the fact that these are highly competitive industries, both within themselves and with other industries, but the fact remains that this condition exists.

In order to check our feeling on this subject a letter was sent to a number of sand and gravel, crushed stone, slag and ready-mixed concrete producers in large centers of population throughout the country asking the f.o.b. plant prices for these products for the years 1926, 1930 and 1947. The year 1926 was chosen because it has been regarded as a normal year and many government and other reports are based on it. The year 1930 is regarded as the price and volume peak of the building boom preceding the depression, and 1947 indicates present conditions and is, we hope, the price peak of the present or prospective building boom.

The prices quoted in answer to these letters showed the expected variation between the various localities due to local conditions but also a surprising uniformity in each locality through the years. There were few increases in price from 1926 to 1930 in spite of the increase in demand which had most plants working overtime. Producers were satisfied to take a modest profit on large quantity production and hoped for continued prosperity to pay an adequate return on their investment. Had other industries and businesses done likewise the great depression might have been at least partially averted.

Now the sand and gravel and related industries are again in the same position, holding the line on prices and hoping for a long period of building activity and capacity production. The 1947 prices, according to our informants, are in a few cases lower, in many cases the same, and on the average about 15 to 20 percent higher than in 1926 or 1930. This is a very modest increase and is far less than the increase in the cost of labor, utilities, machinery, supplies, land and other factors entering into production cost, some of which have nearly doubled. It must also be borne in mind that since 1926 and 1930 many of the choicest and best located deposits have been depleted and specifications have been tightened up, making the production of these materials a much more complicated and expensive procedure than it once was. Even the greatly-improved equipment and methods now in use and the trend toward mechanization have not compensated for this. It must also be considered that with the growing use of concrete as a building material and the accompanying dropping off in the demand for pit-run, crusher run, unwashed and uncrushed materials, the average cost of production per ton has gone up considerably.

IN every area the cost of production has gone up much more than the selling price with the result, as one producer put it, that the critical volume in each line has about doubled since 1941. This means that, if he could break even with the sale of 100,000 tons in 1941, it would require 200,000 tons at present prices and costs to show no loss. "Fortunately," he says, "we are so far operating on a volume well above the critical one."

By continuing to hold the line on prices and resisting wherever possible any effort to increase the cost of labor, equipment, supplies, etc., to them the producers of nonmetallic minerals can be a major factor in halting the upward spiral and helping to create a stable economy under which everyone can prosper and our many long-deferred needs can be satisfied. By publicizing their efforts as some companies in this field have done they can influence others to follow their example and gain good will for themselves. Industry in general must follow this example as a unified cooperative effort by all sections of our economy is necessary to check inflation. The recent collapse of the Newburyport Plan is evidence that no one section can do the job alone.

Walter E. Trauffer

Former Orofino Facilities To Equip Alaska's First Cement Making Plant

The first cement manufacturing plant in Alaska will be in operation within a few months near Seldovia under the name of the Alaska Cement Corporation. Partners in the venture, Parker A. Lyle, Charles B. Abbott, Basil Sinclair and Dean Peterson, acquired the equipment from the defunct Orofino (Wash.) plant of the former Washington-Idaho Lime Products Company and arranged to have the facilities shipped to Alaska.

Installation of the plant which had a capacity of 600 barrels daily, will cost about $1,250,000. Limestone will be secured from a 500,000-ton deposit discovered by two of the partners near the site of the future plant, and gypsum will come from Sheep Mountain, 130 miles distant. Coal is available from a mine nearby and power from an REA cooperative.

The company already has a contract to supply 180,000 barrels of cement to an Alaska firm, and military construction planned in this area will take its entire output during the next two years. Officials stated that some of the members of the Orofino plant's staff will join their organization.

It is hoped that the installation of a cement plant in Alaska will stimulate coal production in the territory. Limerock dust, used in mines as a safety measure, has been imported from the United States at a cost of $40 per ton; and recently it has been impossible to use sufficient quantities of the dust to meet the standards of the U. S. Bureau of Mines.

Marquette's Wecker Presses Fight on Rising Cement Costs

Belief that cement prices have reached their peak was expressed recently by W. A. Wecker, president of Marquette Cement Manufacturing Company in his report at the annual meeting of Marquette stockholders.

Pointing out that while cement prices remain extremely low in relation to all other price indexes, even after the small increase effected early this year, Mr. Wecker said that "prices are now as high as they should go" and expressed the hope that they can be left at this level.

Latest U. S. Bureau of Labor Statistics index of wholesale prices shows the average price gain for all building materials to be 75 percent between the 1926 mean and March 15, 1947. On the same index, cement shows a gain of only 11.9 percent, which is the least recorded by any listed commodity.

11-Week U. S. Gypsum Strike Ends at Hammond, Ind., Plant

U. S. Gypsum Company employees at the Hammond, Ind., plant returned to their jobs on May 4 after a strike which had tied up deliveries of wallboard to construction projects for 11 weeks.

The C.I.O. United Gas, Coke and Chemical Workers local accepted a wage boost of 16½ cents over a basic rate of $1.05 an hour. Union officials stated that a one-year contract provides for reopening wage negotiations on October 2 if the cost of living continues to rise. The strike began on February 14.

Diamond Portland Cement To Erect $180,000 Kiln

Production capacity of the Middle Branch, O., mill of the Diamond Portland Cement Company will be increased 50 percent by the erection of a cement kiln by The Rust Engineering Company of Pittsburgh, Pa.

Rust will erect all necessary facilities for complete burning and clinker grinding operations. Cost of the installation will be approximately $180,000.

The United States Gypsum Company of Chicago was recently authorized to build a new plant at Berkley, Va. The new facilities, which will include a crushing and screening house, storage and office space, will occupy approximately 60 acres. The total investment will be about $2,000,000.

Coming Events

June 16-20, 1947—Atlantic City. 50th annual meeting, American Society for Testing Materials, Chalfonte-Haddon Hall.

Rock Flour to Be Prime Product at $125,000 Plant Of Acme Limestone Co.

Plans for the construction and equipment of a $125,000 grinding plant were announced recently by officials of the Acme Limestone Company of Fort Spring, W. Va. Machinery for the new facilities already has been purchased, stated J. A. Rigg, vice-president of the company.

The new plant will be devoted primarily to the production of limestone flour for the rock dusting of coal mines. New machinery will also increase the production of agricultural limestone to approximately double the present output. Other Acme products include railroad ballast, road stone and concrete aggregates.

National Gypsum Executive Aids Texas Explosion Victims

Melvin H. Baker, president of the National Gypsum Company, Buffalo, announced that the firm had placed the entire gypsum board output of its Rotan, Tex., plant at the disposal of Governor Beauford H. Jester to relieve the housing shortage at Texas City, after terrific explosions and resulting fires had destroyed many homes.

Mr. Baker said the plant's production is at the rate of material for about 200 houses a day. He expressed confidence that customers awaiting material from the plant will understand and "forego shipments in this crisis."

Amortization of Liming Costs Permissible in Certain Cases

A bulletin issued by the Agricultural Limestone Division, National Crushed Stone Association, has called attention to Ruling No. 12505 of the Bureau of Internal Revenue, which appears in the March 24, 1947, issue of *The Internal Revenue Bulletin.*

According to this ruling, in certain cases the cost of liming farm land should be treated "as an exhaustible capital expenditure and amortized over the effective period of the lime application." This information should be of interest to farmers who have been accustomed to deduct such cost as a business expense in computing their income taxes.

January-March Building Figures Top $1,600,000,000 In East and Midwest

Investment commitments for construction in the 37 states east of the Rocky Mountains have just set a record high first-quarter total of $1,610,580,000, it was revealed today by F. W. Dodge Corporation, on the basis of a tabulation of contracts awarded during the first three months of this year.

The corporation attributes the record to the high volume of residential contract letting, the first quarter's total amounting to $748,691,000, as against the previous high of $707,366,000, established in the first quarter of 1928. During the first quarter of last year residential contracts totaled $467,035,000 and called for the construction of 67,115 dwelling units. Statistics show that 96,167 dwelling units are provided for under the contracts let in the first quarter of this year. Nonresidential building contracts dropped substantially.

Mississippi Lime Sets Safety Record at Ste. Genevieve

Only 412 days, or less than 0.5 percent of the total of 82,762 man-days worked in the Ste. Genevieve plants of the Mississippi Lime Company of Missouri, Alton, Ill., were lost during 1946 because of accidents, officials have announced. The accident severity rating (based upon the ratio of the number of days lost to the total man-hours worked) for the entire industry is 1.16 and that for the mining industry, 5.58. At the Mississippi Lime Company's plant the severity rating for 1946 was only .62.

A staff member responsible for much of the improvement in the firm's safety rating during the last 10 years is C. D. Clark, full-time safety director. Another factor in raising the company's safety quotient is its employees' suggestion program. At the order of the company, all persons working underground must wear safety helmets; and those needing goggles and respirators are required to wear them when performing certain tasks. The firm also pays a part of the cost of special safety shoes and for treatment of injuries sustained by the men while at work.

American Silica Sand Company Division Opens New Plant

A new agstone and road rock plant was opened recently near Utica, Ill., by the Utica Agricultural Limestome Division of the American Silica Sand Company, Ottawa, Ill.

The new unit has been under construction since the purchase of the Utica Hydraulic Cement Company (founded in 1838) by American Silica Sand in 1946. The opening of the newly-completed plant marked the founding of a new branch of the parent firm. Facilities will accommodate trucks of all sizes, and five can be loaded simultaneously. In addition to agricultural limestone and road stone the plant will also turn out riprap.

Johnston Renamed Head of Washington Brick & Lime Co.

Stockholders of the Washington Brick and Lime Company of Spokane, Wash., recently re-elected Eric A. Johnston chairman of the firm's board of directors. Officers named were the following: Neal R. Fosseen, president and general manager; V. D. Kelsey, vice-president; A. W. Morris, second vice-president; and Ernest J. Frank, secretary-treasurer.

It was reported that the company's new plant at Dishman, Wash., will be in operation in the immediate future.

N.C.S.A. Agstone Division Asks House Group's Aid For Farm Conservation

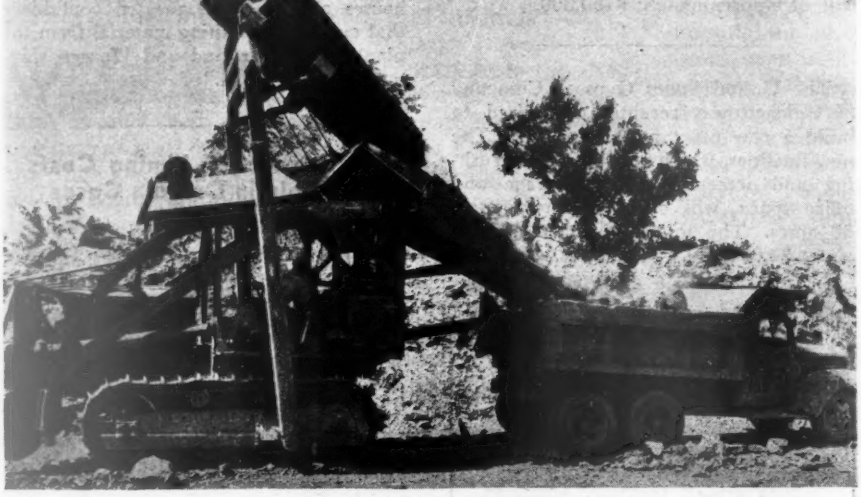
In keeping with the declared policy of the Agricultural Limestone Division, National Crushed Stone Association, to give active support to the Agricultural Conservation Program, a committee representing the division on April 24 appeared before the House Subcommittee on Agricultural Appropriations to request continuance of a $300,000,000 appropriation for this work.

The committee was composed of the following members: Horace Krause, Columbia Quarry Co., St. Louis, Mo.; S. P. Moore, Concrete Materials & Construction Co., Cedar Rapids, Ia.; W. N. Carter, Joliet, Ill.; James Eells, Basic Dolomite, Inc., Cleveland, O.; R. P. Immel, American Limestone Co., Knoxville, Tenn.; R. T. Willingham, Willingham-Little Stone Co., Atlanta, Ga.; and John H. Riddle, Riddle Quarries, Inc., Marion, Kan.

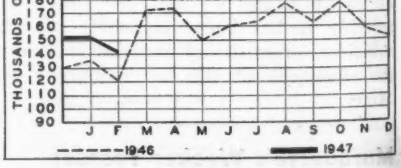
Creedon Urges Lower Prices To Spur Home Building

Housing Expediter Frank R. Creedon has expressed satisfaction with the number of houses completed during the first quarter of this year, but at the same time pointed to a sharp decline in housing starts and warned that unless management and labor join efforts to reduce prices and costs they will price themselves out of the market and the public will not get the houses it needs.

During the first quarter of 1946 there were 192,100 starts of all types; during the same quarter this year, including preliminary figures for March, there were only 158,000. In March of last year there were 86,000 housing starts of all types, while this March, on the basis of preliminary estimates, there were only 59,000.



• At Waldron, Mo., the Missouri River Division, U. S. Engineers, loads shot rock from an open quarry with a Caterpillar diesel D8 tractor teamed with an Athey Mobiloader. The unit loads a 6-ton truck in 45 to 60 seconds. The rock is taken to barges for levee rip rap jobs along the Missouri River. A second tractor cleans up the quarry.



According to data collected by the National Lime Association, 45 companies in February, 1947, shipped 141,367 tons of lime (89,801 quicklime; 51,566 hydrate). Reporting companies represent 46.4 percent of the association members' total capacity of record. Based on Pit and Quarry's estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 335,000 tons. Shipments of lime by users for January, 1947, were:

	Quicklime (tons)	Hydrate (tons)
Agricultural	968	9,333
Building	9,110	22,244
Chemical	79,723	19,969
Total	89,801	51,566

Wolverine Cement Plant Gets Federal Order To Cease Operations

The Wolverine Portland Cement company on April 24 filed with the Federal District Court in Grand Rapids, Mich., a petition requesting reorganization. The petition was approved by the court, and The Michigan Trust Company of Grand Rapids was appointed trustee of the company.

Engaged in the manufacture and sale of Portland cement, the Wolverine Portland Cement Company has two plants: one in Coldwater and another in Quincy, Mich. The petition shows assets of over $965,000 and liabilities of approximately $340,000. The company will continue operations under the supervision of the trust company.

On April 30, according to reports, the Federal Court ordered the company to cease operations, but to continue the grinding of clinker already produced and to carry on necessary maintenance work.

$566,363,000 in Non-Housing Grants Okayed by Expediter

Non-housing construction approved during the 12-week period from January 10 to April 3 totaled $566,363,000 for a weekly average of $47,197,000 as against a weekly permissible average of $50,000,000, according to the Office of the Housing Expediter. During the last week of that period, 2233 applications were approved for a total of $57,877,000, while 1053 applications were denied for a total of $22,823,000.

R. C. Ried Now Affiliated With Knowles Associates

R. C. Ried, formerly with Valley Forge Cement Company, Separation Process Company, and more recently with General American Transportation Corporation, Process Equipment Division, is now with Knowles Associates at 19 Rector Street, New York City.

This new organization is headed by Dr. C. L. Knowles, formerly with the Dorr Company and General American. Otto R. Kuster has also joined this group.

Knowles Associates has a staff of experienced and competent engineers prepared to do work in the chemical, nonmetallic, metallurgical and allied fields. They propose to handle machine and process design, and are especially qualified in cement, phosphate, coal and allied operations.

29th Convention of N.L.A. Held at Hot Springs, Va.

The 29th annual convention of the National Lime Association and the 45th annual meeting of the lime industry were held May 5 to 8 at The Homestead, Hot Springs, Va.

Among the speakers who addressed the various sessions were the following: W. C. Kendall, Car Service Division, Association of American Railroads; Edmund B. Besselievre, The Dorr Company, New York City; W. W. Cerna, Hall Laboratories, Inc., Pittsburgh, Pa.; Victor J. Azbe, president, the Azbe Corporation, St. Louis, Mo.; W. E. Mahin, Metals Research, Armour Research Foundation, Chicago; W. F. Rochow, Harbison-Walker Company, Pittsburgh, Pa.; John R. Green, Brown Instrument Company, Philadelphia, Pa.; H. S. Hangen, St. Regis Paper Company, New York, N. Y.; Wallace E. Wing, president, the Marblehead Lime Co., Chicago; Arthur C. Hewitt, the Warner Company, Philadelphia, Pa., and Vincent P. Ahearn, executive secretary, National Sand and Gravel Association, Washington, D. C.

300 Guests Attend Show And Enjoy Hospitality of Lippmann Engineering Co.

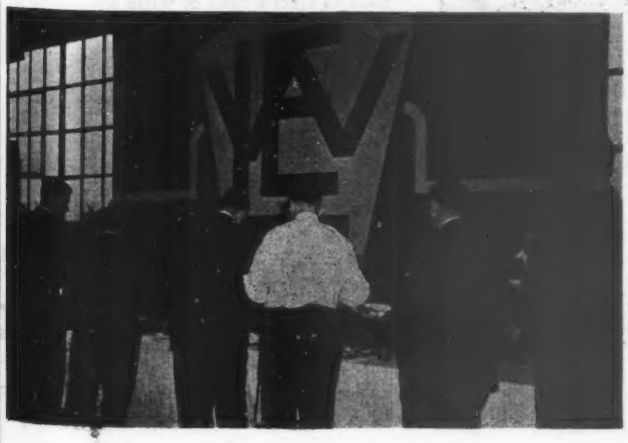
Approximately 300 customers of the Lippmann Engineering Works attended an open house and buffet luncheon at the company's factory in Milwaukee, Wis., on Saturday, April 19. Included in the impressive display of Lippmann equipment was the world's largest overhead eccentric jaw crusher, a 36- by 48-in. machine which tips the scales at 84,000 pounds, crushes 135 to 210 t.p.h. of hard rock at a 3-in. discharge opening.

Also exhibited was the latest model of the Lippmann self-propelled dual crushing, screening and loading plant, a development pioneered by this company several years ago. The unit displayed has an overall length of 53½ ft., stands 14 ft. high and mounts two crushers, a 12- by 36-in. jaw and a 30- by 20-in. double roll. A new feature, shown for the first time, was a hydraulic steering mechanism.

The buffet luncheon served at noon more than upheld Lippmann's fine reputation for hospitality and Milwaukee's considerable renown as the city of good food. On the preceding night the company's employees and their families were similarly entertained.

The Mt. Whitney Rock Products Company has been organized at Lone Pine, Calif., by Geoff Watterson. Screening and loading equipment has been secured. Products will be sand and gravel.

The Tex-Mex Cement Company of Corpus Christi, Tex., organized by the Halliburton oil-well cementing interests, is building a cement plant at Corpus Christi.



• Below: Guests line up for an excellent buffet luncheon in the shipping room of the Lippmann Engineering Works, Milwaukee, Wis., upon the occasion of the firm's open house on April 19.

• Right: The company's top officials obligingly posed before the world's largest overhead eccentric jaw crusher. Left to right: A. F. Albrecht, production manager; C. F. Fricker, advertising manager; A. W. and E. E. Lippmann, co-managers.

7500 Cement Workers Return to Eastern Plants After 20-Day Strike

Cement plants in the Lehigh and Hudson Valley districts were closed down on May 1 by a strike involving approximately 7,500 workers. The chief issue in the strike seemed to involve packing plant operators, the employers' contention being that current car shortages and other factors have made it impossible to continue packing on a single shift as required under the present union contract. Of the 7,500 men rendered idle by the strike, only about 250 are employed in packing operations. Both company and union officials anticipated an early settlement, which was effected May 20.

Loss of production as a result of the strike is reported to have created serious shortages of cement in the New England states, New York, Pennsylvania and New Jersey. In many instances contractors were forced to stop work on construction projects in the affected areas.

War on Stream Pollution Declared at A.C.S. Meeting

In an address delivered before the Pennsylvania section of the American Chemical Society, Dr. Holbrook, dean of the engineering school of the University of Pittsburgh, decried the pollution of Pennsylvania's streams by the waste products of industry.

He stated that Governor James H. Duff of Pennsylvania considers his election a mandate to eliminate stream pollution and indicated that definite action would be taken against companies and cities which have not rectified their polution problems.

Papers presented during this session covered treatment methods for various types of waste. Prominent among purification agents mentioned was lime, used alone or with supporting chemicals.

Marquette's General Offices Moved to New Site in Chicago

After having been located for 49 years in the Marquette Building at 140 South Dearborn Street, Chicago, Marquette Cement Manufacturing Company general offices were moved on May 5 to 20 North Wacker Drive, Chicago, the Chicago Civic Opera Bldg. The company will occupy all of the 36th floor and a part of the 35th floor at that address.

Marquette's offices at the new address will be among the most modern and efficient in the country. Other Marquette offices are located in St. Louis and Memphis. The company operates cement manufacturing plants at Oglesby, Ill., Des Moines, Ia., Cape Girardeau, Mo., and Nashville and Cowan, Tenn. Other operations are maintained at Milwaukee and Green Bay, Wis.

Appropriations totalling $4,000,000 were made by the Lehigh Portland Cement Company, Allentown, Pa., during 1946 for construction, rehabilitation and improvements of its several plants. Such alterations and improvements were made at Sandt's Eddy, Oglesby, Iola, Union Bridge, Cleveland, Buffalo, Mitchell and Mason City facilities.

Carney Company Sales Climb as Expansion Doubles Total Output

According to a statement made by W. B. Lee, executive vice-president of the Carney Company, Inc., of Minneapolis, Minn., the gross sales of the firm during the first three months of 1947 were $506,755, more than double the amount for the same period in 1946.

The Carney Company, Inc., represents a merger of The Carney Company and Carney Rockwool Company which was effected July 1, 1946. Assets of the new firm are in excess of $1,000,000.

Extensive modernization and expansion projects now nearly completed have more than doubled the company's productive capacity, stated Mr. Lee. The annual cement production value is quoted as $1,000,000, and that of the rockwool plant $3,500,000.

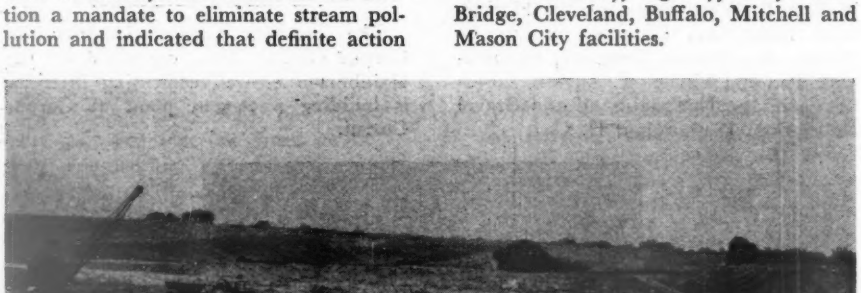
Currently the company is constructing a $200,000 rockwool plant at Longview, Wash. Carl Heim has been reappointed vice-president in charge of the company's Longview operations, and N. A. Holmer is vice-president in charge of Longview's sales.

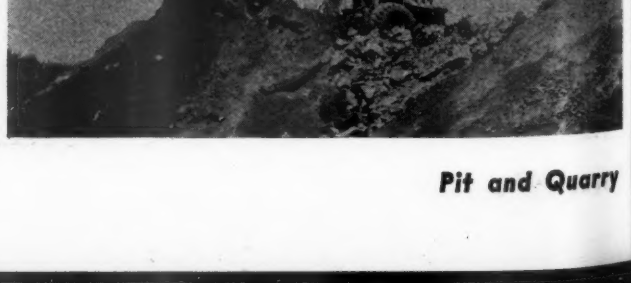
T. P. Walters, vice-president and formerly assistant to the president, has been placed in charge of all company production.

Columbia Quarry Units Attack 25-Ft. Overburden

With 25 feet of top soil and loose rock to be removed prior to quarrying operations, the Columbia Quarry Company of Columbia, Illinois, use their four Tournatrailers through the summer to load sandy clay and rock over a 2700-foot all-weather, well-maintained haul road. On the last 300 feet approaching the waste area the units climb a 7 percent grade.

Columbia Quarry's Tournatrailers are used during the winter months to haul rock. A 3½-cu.-yd. Bucyrus Erie dragline is used in the loading operations.





- Left: Tournatrailers travel the all-weather 2,700-foot haul road at the site of the Columbia Quarry Company's operations at Columbia, Ill., carrying waste material to the dumping area.
- Below, left: A Tournatrailer being loaded with sandy clay and loose rock on the company's 25-foot overburden job.
- Below, right: A Tournatrailer body slides back to eject a load of waste material at the dumping site.

Celestite-Strontianite Beds Worked By California Firm

• Mound containing rhyolite on the Rowe-Gabelic-Buehler claim.

IN San Bernardino County, Calif., on the southern slope of the Cady Mountains, and about two and one-half miles north of Lavic, there is a commercial deposit of celestite and strontianite, two of the rarer non-metallic minerals.

Celestite (strontium sulphate, $SrSO_4$) after processing, has many commercial uses, but is used principally for signal flares, railroad fuses and red fire, in pyrotechnic manufacture. During the war there was also a demand for strontium compounds to be used in the tracer elements of certain shells. Celestite has also commercial possibilities in the manufacture of rayon, and in sugar refining. Low-grade celestite is used as a weighting material in oil-well mud. Strontianite (strontium carbonate, $SrCO_3$) is processed for similar uses, and has been used as a flux for removing sulphur from steel.

A number of claims in this area are owned by W. N. Rowe, Marie Jean Gabelic and William C. Buehler, who are members of a company with main offices in Pasadena, Calif. Mr. Rowe, who is president of the company, is the owner of a lumberyard, and is not a mining man, although he takes a great deal of interest in the mining business. Miss Gabelic is thoroughly conversant with all aspects of mining, as she is a graduate of one of the principal colleges on the Pacific Coast, where she majored in geology and mining. Mr. Buehler is a mining engineer with years of experience in the United States and South America.

Both the celestite and strontianite deposits are worked by the open-cut method —no shaft is necessary. Equipment used in the operation consists of an Ingersoll-Rand compressor, a Ford pickup truck, and a five-ton International truck. Hercules Giant powder (40 percent) is used, as it will spring the ledges where a stronger powder would shatter the material.

The shipping point is Lavic, a section house on the main line of the Santa Fe Railroad. Several shipments of crude ore were made during World War II, and a few shipments were made before 1941, according to Mr. Buehler. The company has owned the claims since 1937. Most of the present shipments are made on contract of a year's supply, and only crude ore is shipped. Customers are located both in the West and along the Atlantic seaboard. Price per ton f.o.b. cars is $13.00.

Mr. Buehler describes the celestite deposits as being "of sedimentary origin, and of Tertiary Age. The average percentage of strontium sulphate (celestite) is 90-92 percent mine-run," while the percentage of the strontianite (strontium carbonate) "will average 85 to 90 percent general mine-run." Included in the deposits are large amounts of magnesium, dolomite, manganese, volcanic ash and lava. Seen from the highway, the deposits appear as a series of white outcroppings above the sand dunes. The celestite zone crops out for over 4,000 feet along the center of the mountain front, and is dislocated by obscure faults, which are indicated by the displacement of the outcrops. The celestite occurs in beds as much as five feet thick, interbedded with shaly tuff and clay. It is a crystalline rock, of light buff and green tints. Microscopic examination shows that it often contains chalcedony, which has replaced the celestite.

The thickness of the beds varies from a few inches to about five feet, and two of the beds can be traced for over 300 feet in length. The bedding is well marked by the contacts of the shaly tuffs with the celestite, but these contacts, while distinct, are not sharp in the sense of forming surfaces of easy parting. The two substances are firmly united by a very thin transition zone, even where the celestite beds are the thinnest.

It is estimated that the western part of the deposit alone contains about 75,000 tons of celestite rock of different grades, while the eastern half contains between 50,000 and 70,000 tons of celestite that has escaped silification.

Strontianite, in southeastern California, is known principally as the alteration product of celestite. There are only a few claims of strontianite in San Bernardino County, according to Mr. Buehler, and most of the deposits in the company claims are small, containing only about one cubic yard of material.

One such deposit, says Mr. Buehler, occurs in a series of beds of the upper Miocene age. The strontianite is usually in elongated nodular masses following the bedding planes of the shaly tuff and clay, and also as concretions which transect the bedding and appear to have replaced the materials of the bedding planes. The common variety is a light gray color and resembles a hard-

William C. Buehler

ened clay, but it has a heavier specific gravity. Other varieties appear as fine crystalline masses, dark brown to black spherulitic masses. Strontianite bodies are believed to have been formed by the precipitation of strontium as carbonate from sulphate solutions, representing concentrations derived from the small quantities of celestite originally in the shale.

New York County Asphalt Plants Ordered Dismantled

The Erie County (N.Y.) Board of Supervisors has authorized county highway superintendent Arthur J. Yaw to dismantle asphalt plants in Clarence Center, Hamburg and East Aurora, and to dispose of the machinery.

Mr. Yaw said the plants were obsolete and it would be more economical to buy asphalt materials.

Officials of the American Potash & Chemical Corporation of Los Angeles have announced plans for extensive alterations and enlargement at the Trona, Calif., plant. The improvements, it is estimated, will cost approximately $7,000,000.

WASHINGTON NEWS LETTER

another PQ exclusive

THE national economic picture has been considerably brightened by the series of agreements reached between labor and management in recent weeks in the nation's major industries. Even the more pessimistic members of Washington officialdom are encouraged by the prospect of labor peace and the favorable atmosphere it creates for increased output, which is still regarded as the best remedy for excessive prices.

Furthermore, the President's top economic advisers for several months have iterated and reiterated their opinion that the decline of the nation's real buying power, if not arrested, was leading the country straight into the much-publicized recession. Admittedly, there are only two ways of halting or reversing a downward trend in public purchasing power—by raising income or lowering prices. The recent round of wage increases, it is felt, serves the first of these alternatives. The wage adjustment pattern that finally emerged from the settlements with the steel, auto, electrical and other workers will mean a substantial addition to the total income flow in the low and middle brackets, where the impact on consumer spending is generally most immediate and direct.

Earlier this year it was feared that a general wage increase on the scale now being experienced might easily lead to shooting the inflationary spiral further skyward. Certainly a wage jump of this order will not have a contracting effect on the national economy. If it did, the whole purpose of the jump would be defeated, for it is intended to forestall just such a decline.

But at the same time there are strong indications that increased wage costs will not be reflected in higher prices in the case of most commodities. It is entirely possible, of course, that some companies, which might have been able to reduce prices in the absence of wage boosts, will now not be able, or at least not choose to do so. But "what might have been" is difficult to evaluate at best. Of much more importance right now is that, judging from the announcements of many companies (especially in steel industries), the wage increase, by and large, is not to be passed on to the consumer. As a result, the greater part of the increase represents an immediate addition to the physical volume of consumer demand for goods and services.

In the meantime, the government is continuing its campaign to bring prices down. Although the results to date do not indicate a really significant drop in living costs in most cities, a movement of this kind tends to serve as a drag on price advances that might otherwise have been put into effect. Whether through voluntary price reductions, consumer resistance, or seasonal price declines, the forward march of the cost of living has been brought under control, at least for the time being. Higher money incomes in the hands of individuals can be expected to exert renewed pressure on the overall level of consumer prices, so that action on the part of business men in cutting their margins will be more important than ever.

In any case, the main difficulty is not with the prices of industrial commodities, which are primarily involved in the new wage structure, but with farm prices. As is well known, it is in the latter segment that the most sensational jumps have occurred. The government has come in for quite a lot of criticism lately on the ground that some of its activities have served to aggravate an already difficult problem. An illustration frequently cited is its program of farm price support, which is attacked as helping to keep a floor under prices that are not only extremely high at this time but badly out of line in relation to other commodity prices. Actually, of course, there is virtually no discretion on the part of the government in administering price support. Laws already on the books require such support for almost all important agricultural commodities until the end of 1948. If it is felt that the support program should be administered with an eye to the welfare of the economy as a whole, rather than the needs of the agricultural interests alone, the proper remedy appears to be the enactment of new legislation. From a purely political point of view the chances of reducing these benefits before the end of next year seem to be less than nil.

But there is a more fundamental truth to be considered in appraising the validity of the charge that government activities are responsible for the high level of farm product prices. The fact is that except for one or two foods relatively unimportant in the cost of filling the consumer's market basket, actual farm product prices have for some time been above the legal support prices. If government policy exerts any bolstering effect on these prices, it must be largely psychological.

To a very large extent market prices for farm products faithfully mirror demand-supply conditions. So long as aggregate domestic and foreign demand remains high in relation to available supplies, prices will not come down. The answer is not to restrict the amount we furnish to needy peoples overseas, as has been irresponsibly suggested in some quarters, but rather to push output to the point where requirements can be fully satisfied. That is why it is gratifying to note that another record-breaking crop is predicted for this year's winter wheat harvest.

As agricultural conditions abroad return to normal, foreign countries will become less and less dependent upon the United States as a source of food supply. Sooner or later, the farm experts say, the pre-war tendency toward large agricultural "surpluses" will start to appear in this country and eventually in other countries. If past experience is any guide, this state of chronic surplus will exist in the same world in which there is also chronic starvation. The age-old problem, it goes without saying, is how to cancel them out.

Pacific Portland's Profits For 1946 Top Half Million

Net profits of $572,416 for the year 1946 were reported by officials of the Pacific Portland Cement Company of San Francisco. This amount is equal to $16.40 a share on the 34,894 shares of 6½ percent preferred stock outstanding with dividends in arrears. In 1945 the net profits reported were $9,542.

Sales in 1946 amounted to $5,883,542, as compared with $4,297,804 in 1945, an increase of 37 percent.

MEN OF THE INDUSTRY—POWER SHOVEL OPERATOR FAMED FOR UNUSUAL HOBBY

IF you were looking for a craftsman qualified to make violins of the finest tone and workmanship, you would scarcely expect to find one at the controls of a big mechanical shovel among huge piles of slag. But a man who is an expert at these incongruous accomplishments is W. L. Howell, operator of a Marion 490 shovel at the plant of the Midland Slag Company, Midland, Pa.

Mr. Howell's amazing avocation is the result of a chance "good turn" on his part, as recounted in the October, 1946, issue of *The Marion Groundhog*. According to the *Groundhog*, the evolution of this modern Stradivarius began in 1933, when a friend appealed to him for help with a new hobby. The friend had sent for plans and materials to construct a violin. Knowing Mr. Howell's skill as a mechanic, he took his outfit to the Howell basement shop. Eventually the friend's enthusiasm waned, and Mr. Howell continued the project on his own.

The mail-order plans, however, seemed inadequate to Mr. Howell, and he began to conduct an extensive research for supplementary information on the making of fine violins. Determined to produce instruments of quality equalling the standards of his big shovel, he explored every possible source of information and rare materials. Often, while vacationing, he stops at a sawmill yard and examines pieces of lumber, tapping various kinds of wood for tone quality.

Since 1933 Mr. Howell has turned out 26 violins, some of which are now being used by artists in orchestral and concert work. Painstaking work and uncompromising insistence upon the highest standards in workmanship have won for him the reputation of a superior craftsman. The skill which he now possesses was developed over a long period of persevering effort; there was no shortcut to his present level of proficiency.

• W. L. Howell at work on one of the 26 violins he has turned out in his home workshop.

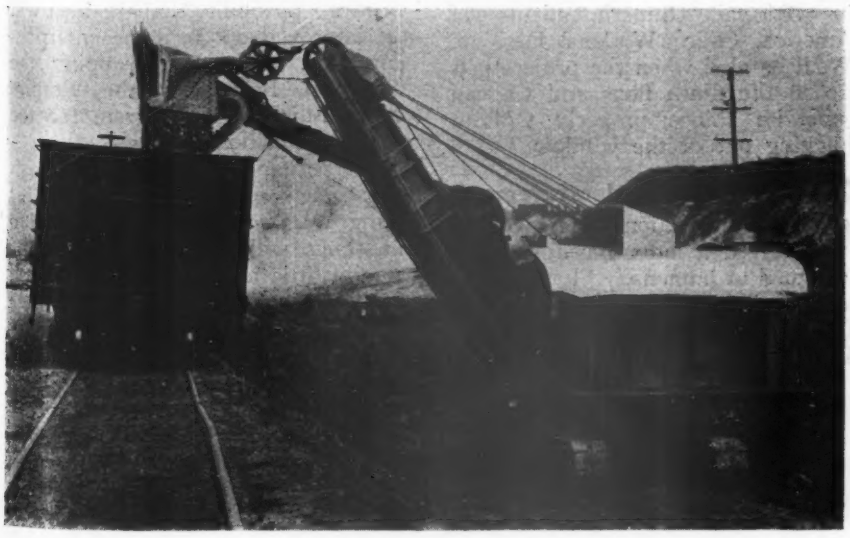
As Mr. Howell's friend learned, there are fiddles and fiddles. The knowledge of just how to select and prepare the most suitable wood, the proper glue, the technique of applying the finish—all this accounts for the difference between an ordinary violin and one of superior quality. Because he has acquired this know-how, Mr. Howell can turn out various types of instruments to order—from a deep-voiced bass to a thrilling soprano. Dave Rubinoff, who tried out a Howell violin after one of his concerts, pronounced it excellent, and took one of Mr. Howell's instruments with him for his collection.

But the man whose skill can turn out these rare singing instruments is equally proficient on the job at the slag plant. Loading 800 tons of slag into railroad cars is a regular day's work for him. Mr. Howell states that his Marion 490 has been loading slag, a tough and abrasive material, continuously since 1928, and is still using its original dipper. One reason for the longevity of the machine is undoubtedly Mr. Howell's habit of treating it as he would "any other fine piece of machinery."

Before joining the staff of the Midland Slag Company in 1928 Mr. Howell was an erection engineer for The Marion Steam Shovel Company, now Marion Power Shovel Company of Marion, O.

At the Midland plant, operated by one of a group of companies under the direction of the Standard Slag Company, Mr. Howell's job is a vital part of treating a material having many uses. Here the slag, obtained from the blast furnaces of the Midland plant of the Pittsburg Crucible Steel Company of America, is reduced to several sizes at the rate of 90 to 100 tons an hour. The finished product is utilized by railroads and for road building and the manufacture of concrete and concrete products.

• Mr. Howell at the controls of his big shovel at the Midland Slag Company's plant.



Screenings

BY *William M. Avery*

STARTING a new department in a magazine seems to us in at least one respect comparable to having a baby: when the glow of the reproductive urge has passed, there remains the grim necessity of feeding and clothing the infant for so long as it shall remain under your roof. Editors not infrequently find the struggle too demanding, and the brain child, after some months of precarious existence, is quietly scuttled between editions, without explanation or burial rites.

PIT AND QUARRY, in common with most contemporary publications, has been on occasion guilty of this particular form of infanticide. In consequence, it is pretty much like pulling teeth to get a new department launched, and the project is likely to be carried on amid glum predictions that it won't survive the year. We hope, of course, that Screenings will stay around for many a year, and that at least a few of our abnormally silent readers will take enough interest in the scrawny waif to toss it a bone occasionally.

We've felt for a long time that your magazine needed a section in which editors and readers might relax a little, and recognize (at least tacitly) that mankind was probably not created uniquely for the purpose of recovering and processing the nonmetallic minerals. The name Screenings has been adopted because it seems to us rather apt in its application to all the pleasant trivia which a specialized technical journal necessarily screens out in its handling of the news. In the past we've sadly relegated to the wastebasket many a (we thought) choice gem of news or comment because it just didn't fall into any existing category of our magazine. Unlike the crushed stone industry, which had a somewhat similar problem until recent years, we haven't stockpiled our screenings, but we feel reasonably sure that a fascinatingly mad world will furnish each day enough material to run this small department for a century or two.

What's in a Name?

WE stopped at a repair shop the other day to pick up one of the company's cameras, presenting a claim check made out to PIT AND QUARRY. The demure young thing behind the counter glanced at the check and said, "Just a moment, Mr. Pit. I'll see if your camera is ready." All in clean fun we explained that Mr. Pit had passed on many years ago, and that we were the surviving member of the firm. We'll be hanged if she didn't waltz back after a few moments to announce brightly, "Here's your camera, Mr. Quarry!" We're still wondering who was ribbing who.

Construction Notes

OUR staff is dividing its attention these days between the nonmetallic minerals industries and a steel construction job across the street, and we're considering making application for a special charter in Sidewalk Superintendents of America, Office Workers' Division. We'll be glad when the project gets up to the ninth floor and we can supervise things properly without hanging out of the window.

Department of Understatement

OUR circulation manager received a letter recently which intrigued us immensely. It was from a subscriber's wife and it read as follows:

Dear Sir:

I would like to inform you that I know not of Mr. Zilch's whereabouts. He left with no explanation of where he was going.

Yours truly,

(Signed) Mrs. Zilch

There's something about the simple, Shakespearean dignity of this communication that appeals to us strongly. On the one hand it may conceal the fury (like which hell hath none) of a woman scorned, but there is at least an equal chance that it indicates Mrs. Zilch is glad to be rid of the big lug. All things considered, we like the second theory better, but we wonder if Mrs. Zilch has bothered to have the water pumped out of the low end of her husband's gravel pit. Maybe that's where he spent the winter.

New Horizons for Concrete

THE concrete business boomed briefly the other day at Middleburg, Pa., when two strangers sold a local merchant a suitcase full of concrete for $1,000. According to the sellers' specifications, each clam-shell-sized piece of concrete contained a gold piece. Due to some unexplained carelessness in the manufacturing process, however, the adulterant seems to have been omitted from most of the specimens.

This new version of the shell game will probably not cause an immediate upsurge in the demand for cement and aggregates, but there is always a possibility that the idea will be improved upon. Some enterprising gent might try wrapping the Brooklyn Bridge or the Empire State Building in concrete for the benefit of critical buyers.

Or perhaps, now that Chicago is regaining some of its reputation for gang warfare, the new generation of thugs will dust off one of the quaint little jokes allegedly dreamed up by the Capones. In Scarface Al's heyday competitors were neatly disposed of by casting their feet in concrete before shoving them into Lake Michigan. This not only gave the boys an outlet for their fun-loving youthful spirits, but it also discouraged the victim from pulling a Lazarus.

Cinnabar Operation Leads To New Lime Burning System

BURNING of lime is a very old art and has played a very important part in the building of civilization. In fact, this art is so old that we don't know when it was first accomplished, but we do know that it has only been very recently that we have tried to devise new and better methods of making this important product.

Back in 1923 two boys, with a small group including a mining engineer at the head, were interested in a small low-percentage cinnabar property. With all the knowledge this group had gathered, plus the expert guidance of their engineer, they started in mining cinnabar ore and set up the last word in a retort to extract the mercury.

Instead of making the expected profits they soon learned that even with free wood and an abundance of free, snow-cold water, they could only a little more than break even on this low-grade ore with their existing setup for heat treatment.

Not at all satisfied with this arrangement, these two brothers—Victor and Ruben Nelson—set out to devise a furnace that would do four things: (1) give a faster and more positive heat treatment; (2) make a better percentage of recovery; (3) require less fuel and labor; (4) be so constructed as to eliminate constant repairs and replacements.

With these four objectives in mind they started to gradually evolve what is now the Nelson Inclined Furnace No. 5, manufactured and sold by the Victor J. Nelson Engineering and Construction Co., Burbank, Calif.

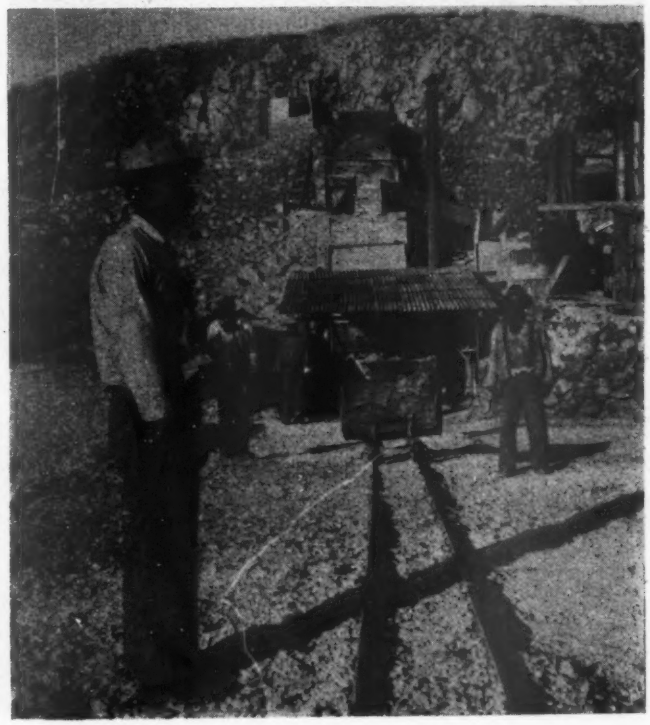
Like all drastic diversions from the conventional it took a lot of experimenting, building and rebuilding, patience and expenditures, but with dogged determination or "scientific ignorance," whichever you want to call it, these boys kept at their ideas. "Like the bee that didn't know he couldn't fly because he didn't have enough wing surface to do so and went ahead and flew anyway," the Nelsons finally were able to get, under certain conditions, more out of a B.t.u. than was conventionally possible.

While operating one of their earlier models of this furnace, on a custom mill basis, in a section of varied cinnabar deposits in old Mexico, it often happened that they would have to shut down for lack of ore. During these shut-down periods expenses went on, but income did not. Ruben, who was on the job at the time, decided to make a try at burning lime to supply the owners of local small mercury retorts who had to use lime mixed with their ore in processing it and also for local building and trade.

Up to that time the lime used had to be brought in by rail and then hauled from the railhead 32 miles, mostly uphill, to the mines by mules. It therefore brought a fancy price. (The location of these mines is a barren, desolate, hilly district far removed from such things as wood or coal and even the water used for necessities had to be hauled 12 miles. Hauling was all done by mules. Six mules to a wagon could only haul one ton about 15 miles from daylight till dark. Most of the ore was handled in sacks by burros.

A small lime deposit about 1½ miles from the furnace furnished the necessary limestone, and 30 tons of this was brought up for a test run. Then instead of shutting down when the cinnabar ore ran out, the limestone was fed into the furnace, with amazing results. The lime produced was evenly and thoroughly burned, with less than 6 percent of unburned cores and fines on the first try. On the next test the stone was sized from approximately ¾ in. to 4 in. and the unburned cores reduced to 2 percent. Then by sizing 1 in. to 4 in. unburned cores were practically eliminated. On these tests 13 to 14 tons (metric) of lime was produced each 24 hours and crude oil used was 86 liters (about 22 gal.) per metric ton of lime produced,

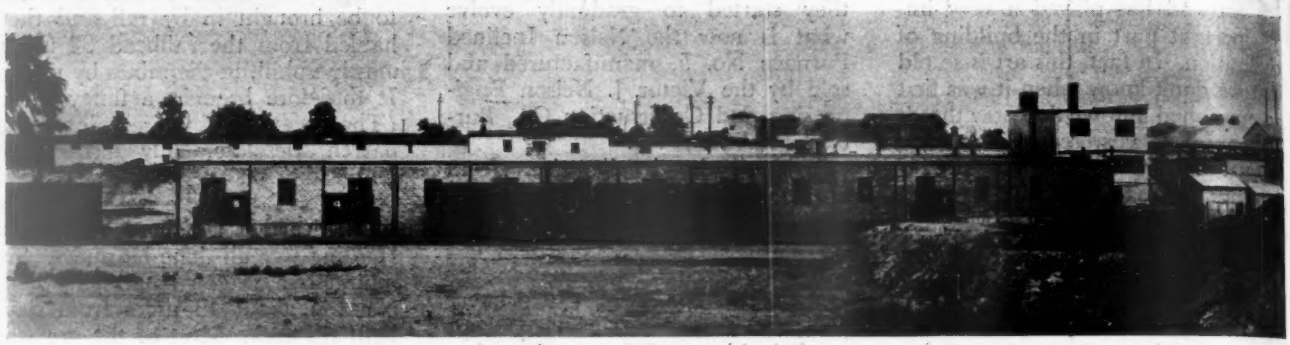
(*Continued on page* 66)



• Victor Nelson at construction site as work began on the Nelson Inclined Furnace for treating mercury ores in the Cuencamey mercury district, Mexico.

• The Mexican plant in operation, showing the foreman standing on the first lime produced.

Canadian Rock Wool Plant Achieves High Efficiency with New Equipment



• A general view of Gypsum, Lime and Alabastine's modern mineral wool batt plant at Caledonia, Ont. The cupola is housed in the raised portion of the building on the extreme right.

another ON THE SPOT report

OUTSTANDING success in their early endeavors in mineral wool production, combined with a tremendous demand for the material, has led to the construction of an ultra-modern, high-capacity plant

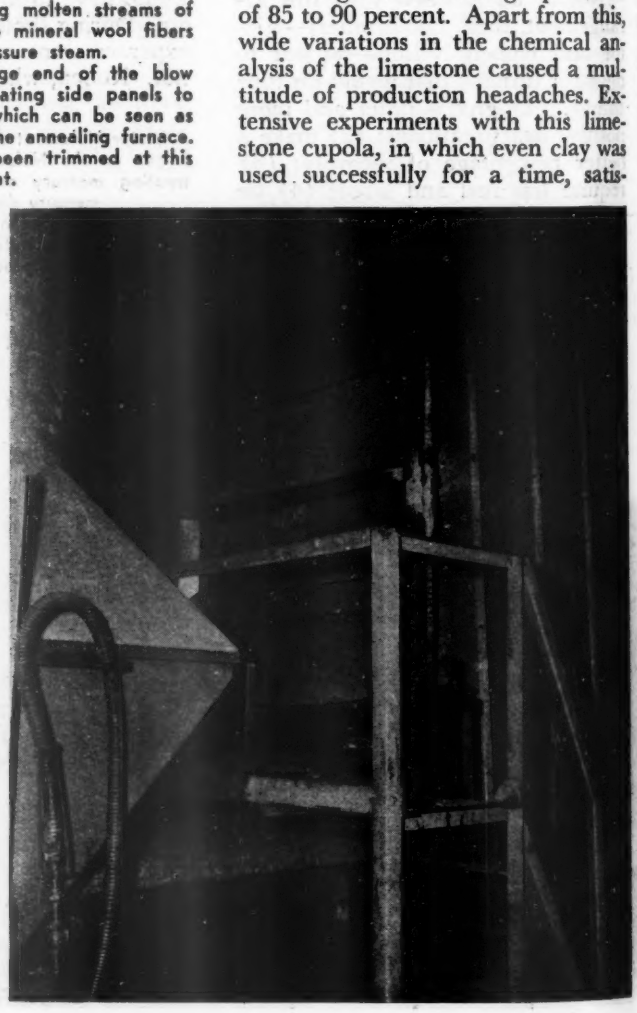
By WILLIAM M. AVERY

by the Canadian firm of Gypsum, Lime and Alabastine, located at Caledonia, Ontario. The new facilities, which went into production in June, 1946, incorporate a number of features which are quite new in the mineral wool industry, and the plant is in many respects a fine example of the resurgence which seems to be in progress in many phases of Canadian industrial activity.

The company's initial undertaking in the mineral wool field dates back to 1936, when plain white wool (without binder) was first produced from high-silica limestone. Although the whiteness of the product was unquestionably desirable from the sales standpoint, there were certain disadvantages in the use of limestone as compared with slag. Recovery ran around 60 percent, as against an average on most slag operations of 85 to 90 percent. Apart from this, wide variations in the chemical analysis of the limestone caused a multitude of production headaches. Extensive experiments with this limestone cupola, in which even clay was used successfully for a time, satis-

• Below, left: The base of the 38-in.-diameter cupola, showing molten streams of rock being blown into mineral wool fibers with high-pressure steam.

• Right: The discharge end of the blow room, which has oscillating side panels to form the neat edges which can be seen as the strip passes into the annealing furnace. The edges have not been trimmed at this point.



fied the company that mineral wool could be produced from practically any material containing at least 40 percent silica.

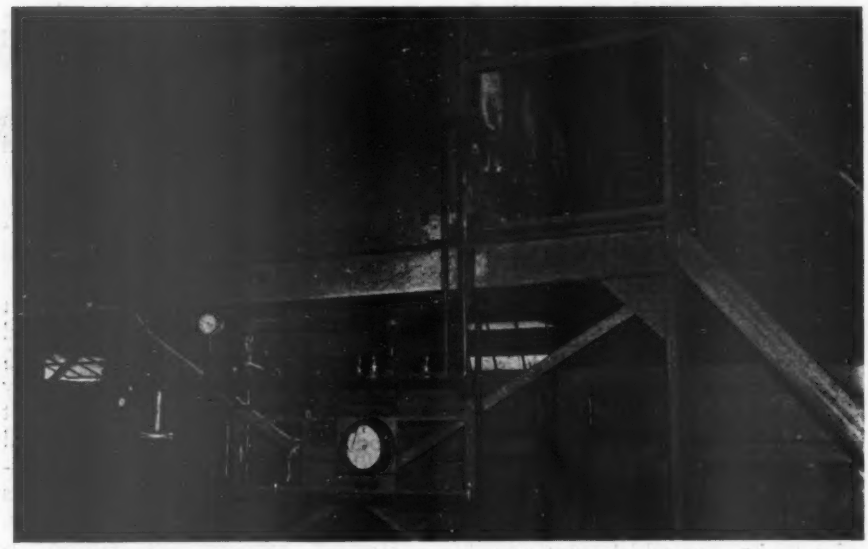
To increase the recovery rate, however, the second cupola installed in 1941 was designed to operate on slag, and the following year the original cupola was converted to slag. Initially the company's entire slag requirement had to be shipped by rail from Buffalo, but subsequently a slag-processing plant was established at Hamilton, Ontario, and a portion of the supply is now trucked from that locality.

The new production unit, which at present produces only batts, is housed in an entirely new fireproof building in which provisions have been made for a total of four cupolas. The single cupola now in operation is 48 in. in diameter (compared with 36 in. on the older units) and about 20 ft. in height. Designed by the company's own engineers and built by the Hamilton Bridge Co., it is completely water-jacketed and utilizes a Foster-Wheeler heat exchanger to effect a 20-degree drop in the temperature of the cooling water.

The cupola is fed continuously at the rate of about two tons per hour, using a 2- to 4-in. slag in the ratio of 4½ parts (by weight) to 1 of coke. When better coke becomes available, the company expects to be able to increase this ratio to about 5½ to 1. The raw materials are drawn from bins, blended with up to 2 percent sandstone to lift

• Below, left: Vapor seal, from reels located in the concrete pit under the production line, is applied to the bottom surfaces of the 15-in. strips.

• Below, right: Thirty-six inches of wool is compressed into a 24-in. carton by forcing the carton through this double-frame roller conveyor. Resiliency, imparted to the material by the binder used, prevents any permanent compression of the fibers.



• A general view of the 56-ft. oil-fired annealing furnace where the binder is set. Temperatures in this unit are thermostatically controlled, and both surfaces of the blanket are annealed by means of updraft and downdraft sections.

• A view of the power-driven band saw which automatically cuts the strips into 4-ft. lengths. In the background is the platform scale on which the packed cartons are check-weighed.

the silica content, weighed and elevated to the top of the cupola by an 18-in. belt conveyor.

The melt is carried out at a temperature of around 2,700 degrees F. and the molten rock is discharged continuously through four nozzles at the base of the cupola. Fibers are produced in the usual manner by blasting the molten material with high-pressure steam as it flows from the cupola. The asphaltic binder, which imparts the dark brown color associated with mineral wool, is introduced at the moment the fibers are formed.

The fibers enter a blow room which is about 12 ft. high, 35 ft. long and a little over 5 ft. wide. Here the wool is pulled down by means of a 25-hp. fan which continuously exhausts about 25,000 cubic feet of air per minute.

From the blow room to the final cutting operation the blanket of mineral wool moves on a continuous Wickwire-Spencer chain belt driven by a 5-hp. Reeves Varispeed Moto drive. The strip, measuring 60½ in. in width, passes from the blow room into a 56-ft. oil-fired annealing furnace (designed and built by J. Campbell Smith) where the binder is set at temperatures ranging between 600 and 700 deg. F. Accurate temperature control is effected by dividing the 10 burners into two groups of 5 each; one group operates constantly, while the other is thermostatically controlled.

In order to anneal both sides of the blanket the oven is divided into sections, with a rising stream of air in the front portion and a downward stream in the back portion. Additional control of the annealing conditions is effected by varying the speed of the fan drive motor. In order to prevent disarrangement of the fibers, the blanket during its passage through the annealing furnace is held between upper and lower chain belts. The strip of mineral wool passes from the furnace into a 15-ft. cooling chamber in which the temperature is reduced about 200 degrees.

Power-driven circular knives, located just beyond the cooling chamber, split the blanket into four 15-in. strips. Since the material is fully cured at this point, there is a ready market for the comparatively small amount of bulk side trim which is created in the splitting operation. Vapor seal, heated electrically to 300 or 400 deg. F., is applied to the bottom surfaces of the strips, which are then cut into 24-in. and 48-in. lengths by a power band saw. The downward stroke of the band saw is actuated by a limit switch located on the extreme end of the runout conveyor, assuring remarkable accuracy and uniformity in the length of the finished batts. The finished product, sold under the trade name Gyproc Wool, is packed in 24-in. and 48-in. cartons which are check-weighed on a Fairbanks Springless scale.

In a typical 22-hr. run this plant was charged with 9 tons of coke and 36 tons of slag, which yielded 32½ tons of finished wool for a recovery rate of 91 percent. Although most producers of the material would consider 91 percent a quite satisfactory recovery, this company wants and expects to increase the rate. Highest recovery, of course, is achieved when the plant is producing 4-in. batts, the rate drops slightly for 3-in. and 2-in. batts, and may fall materially on 1-in.

In 24 hours the new production line (which is designated as plant No. 3) turns out about 2,000 cartons of finished batts, employing about 22 men on each shift. This output is about 50 percent higher than that of the No. 2 batt plant, which employs about the same number of men, and is roughly comparable in other respects except for the size of the cupola. Both the older cupolas are 36-in. in diameter as compared with the 48-in. measurement of the newest unit. The company's No. 1 plant, incorporating the cupola originally designed for limestone, produces granulated wool at present.

The new plant is one of the cleanest mineral wool production units we have visited. Particularly remarkable is the almost complete absence of fly, an accomplishment that it not only reflected in the high recovery rate but contributes materially to the working comfort of the employees.

L. V. Robinson is general superintendent of Gypsum, Lime and Alabastine's varied operations. J. E. Gillespie is assistant to the general superintendent, J. M. Hagan is plant superintendent and Reg Hudspeth is superintendent of rock wool plants. The company's director of quality and research is M. C. Haller.

Cinnabar Operation

(*From page* 63)

plus 10 liters (2½ gal.) of diesel fuel oil per metric ton of lime to make steam for atomizing the crude oil. According to the handbooks this didn't make sense, but on each test it came out very nearly the same.

The lime production per ton was more profitable than the mercury business, but the demand at this locality was very limited.

From this beginning with work, patience and considerable expense the Nelsons have evolved a standardized furnace unit which is neat, exacting, positive in performance and modern in every respect.

Choctaw Lime Plant to Have 300-400-Ton Daily Output

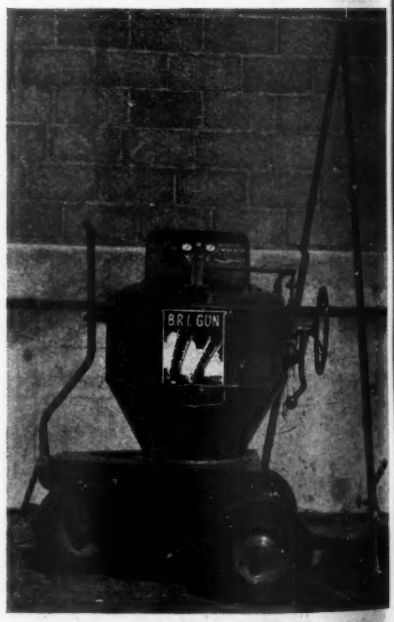
At Ft. Towson, Okla., the Choctaw Lime Company is currently erecting a crushing plant for the production of agricultural limestone. Capacity is expected to be from 300 to 400 tons daily.

J. W. Trieschmann Sr., whose son, J. Werner Trieschmann Jr., is his partner, has operated a lime plant at St. Joe, Ark., a crushing plant at Eureka Springs and a sand plant at Caruthersville, Mo. J. W. Trieschmann Jr. will be in charge of production at the Ft. Towson plant.

Basic Refractories Offers New Refractory and Gun

"Gunchrome," an air-emplaced refractory designed to speed up steel production by reducing "down-time" for maintaining and repairing open-hearth furnaces, has been announced by Basic Refractories, Inc., of Cleveland, O. The product is made from Cuban chrome ore.

Highlighting the opening day meeting of the Open Hearth Committee of the American Institute of Mining and Metallurgical Engineers at Cincinnati, April 21, was a special demonstration of the new B.R.I. gun developed by Basic Refractories.



• The new refractory gun.

This gun was primarily designed to speed the application of "Gunchrome" and similar materials to vertical and semi-vertical furnace brickwalls at the rate of more than 100 pounds per minute.

Convert Permanente Natividad Plant To Peacetime Products

By D. M. KERR
General Superintendent
Natividad and Moss Landing Plants,
The Permanente Metals Corp.

another P-Q exclusive

WITH the outbreak of World War II, the spotlight of light-weight metals was focused on magnesium. Its use in airplanes alone meant more bombs, more fuel, more men and supplies to defeat the enemy. Annual production of magnesium in the United States skyrocketed from 12,500,000 pounds in 1940 to nearly 500,000,000 pounds in 1944 as an indication of its role in bringing victory.

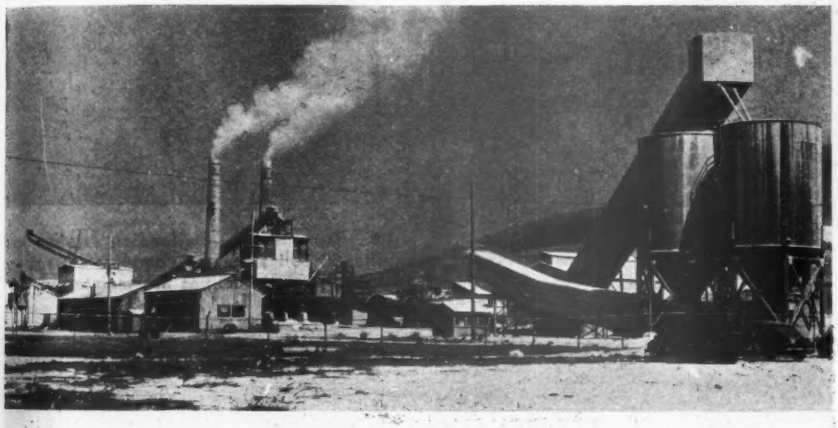
Near San Jose, Calif., is a magnesium plant built by The Permanente Metals Corporation which shared with others this outstanding record. Permanente's portion of this production figure was made possible by two smaller plants that supplied the large quantities of dolomite and magnesium oxide vital to manufacture of magnesium.

Located in the lower Salinas River basin on the Pacific Ocean, Moss Landing provided an excellent site for processing magnesia from seawater. Fifty percent of Permanente's raw material was obtained here and the rest came from a great dolomite deposit at Natividad in the nearby foothills.

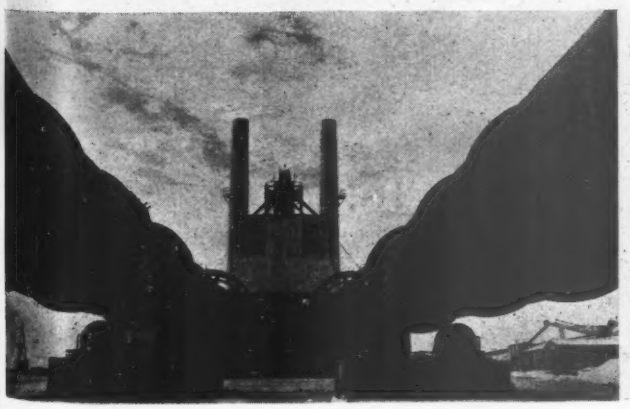
Before the end of the war it was apparent that these plants, working at full capacity, could more than take care of their primary purpose. It was also evident that they would be able to produce successfully to satisfy the demands of our peacetime economy. Therefore, the end of the war found these two plants making a variety of products, the demand for which has grown to the point that it is taxing productive capacity to keep up with orders. The part that Permanente's Natividad dolomite plant is playing in this peacetime production follows.

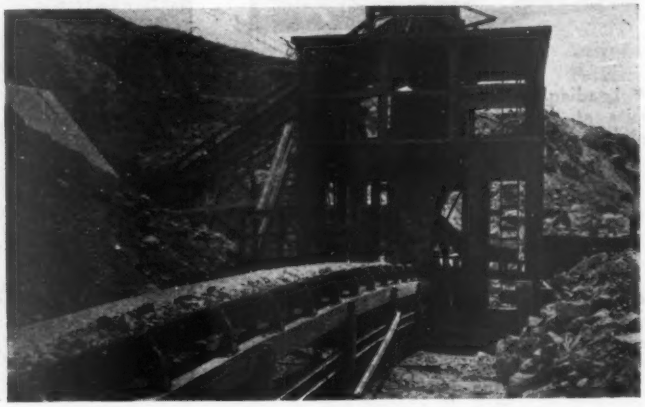
In this Pacific Coast foothill area there are extensive lime and dolomite deposits which have been worked for one purpose or another over a long period of years. For ex-

• Below, left: A view of the Permanente Metals Corporation's plant at Natividad, Calif., which produces calcined dolomite.
• Right: A view of the kiln at the Natividad plant, showing the integral cooler.



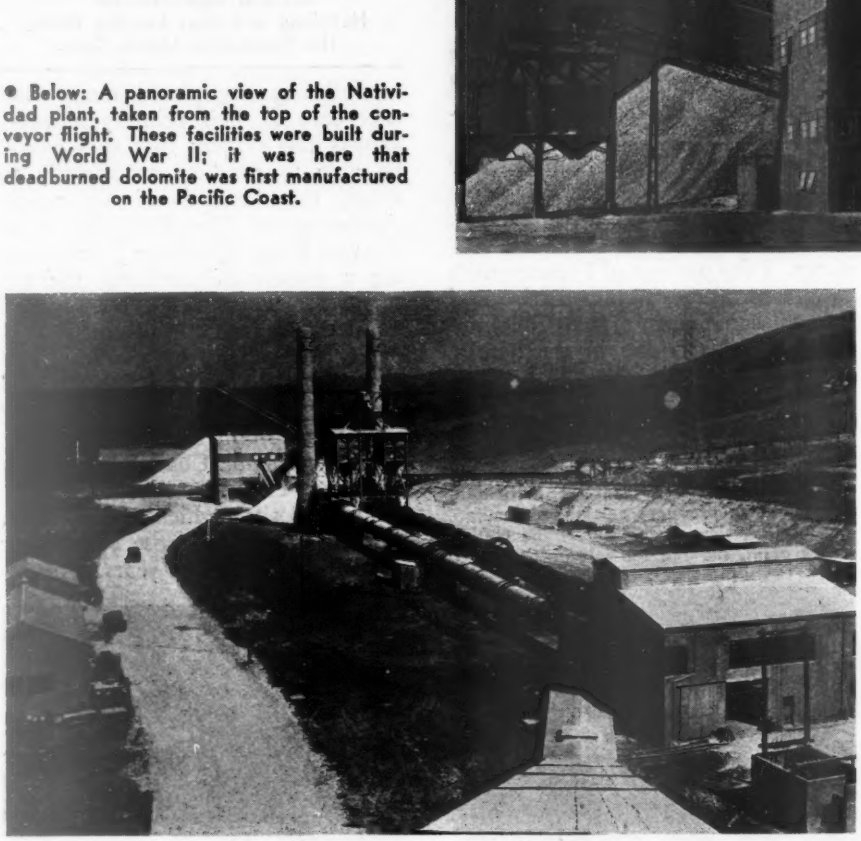
• Left: A 2½-cu.-yd. electric shovel loading dolomite at the quarry face at Natividad.
• Below, left: A perspective of the two 308 ft. by 8 ft. kilns at Natividad.
• Below, right: The screening tower at the Natividad quarry.



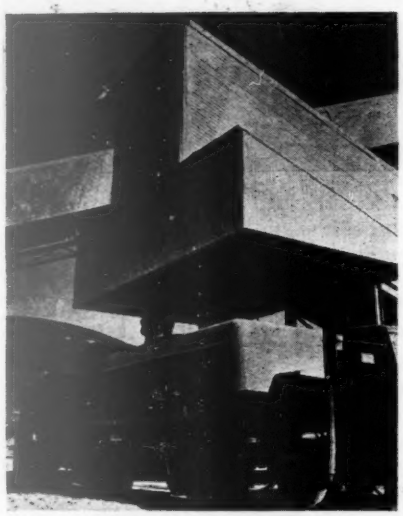


• Right: The secondary crusher building and the primary stockpile at the Natividad branch.

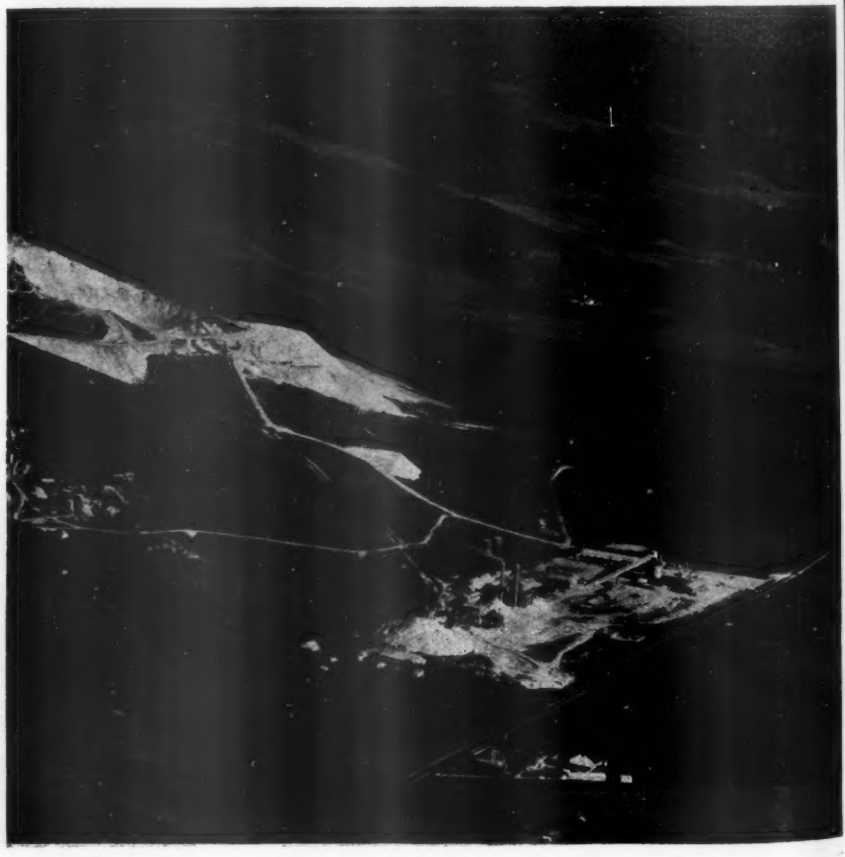
• Below: A panoramic view of the Natividad plant, taken from the top of the conveyor flight. These facilities were built during World War II; it was here that deadburned dolomite was first manufactured on the Pacific Coast.



• Permanente's car-loading station and silos at Salinas, where complete storage and loading facilities are maintained.



• Loading calcined (caustic burned) dolomite at Natividad. This product, one of eight processed at Natividad, is one of the constituents of magnesia.



• Right: An air view of the Natividad dolomite quarry (left background) and the processing plant (foreground). A belt conveyor ½ mile long carries the crushed material from the quarry to the kilns.

ample, the San Juan lime deposits have been used by the Pacific Portland Cement Co. in the manufacture of cement. Raw dolomite rock from two other quarries has been furnished Pacific Coast steel plants for a number of years.

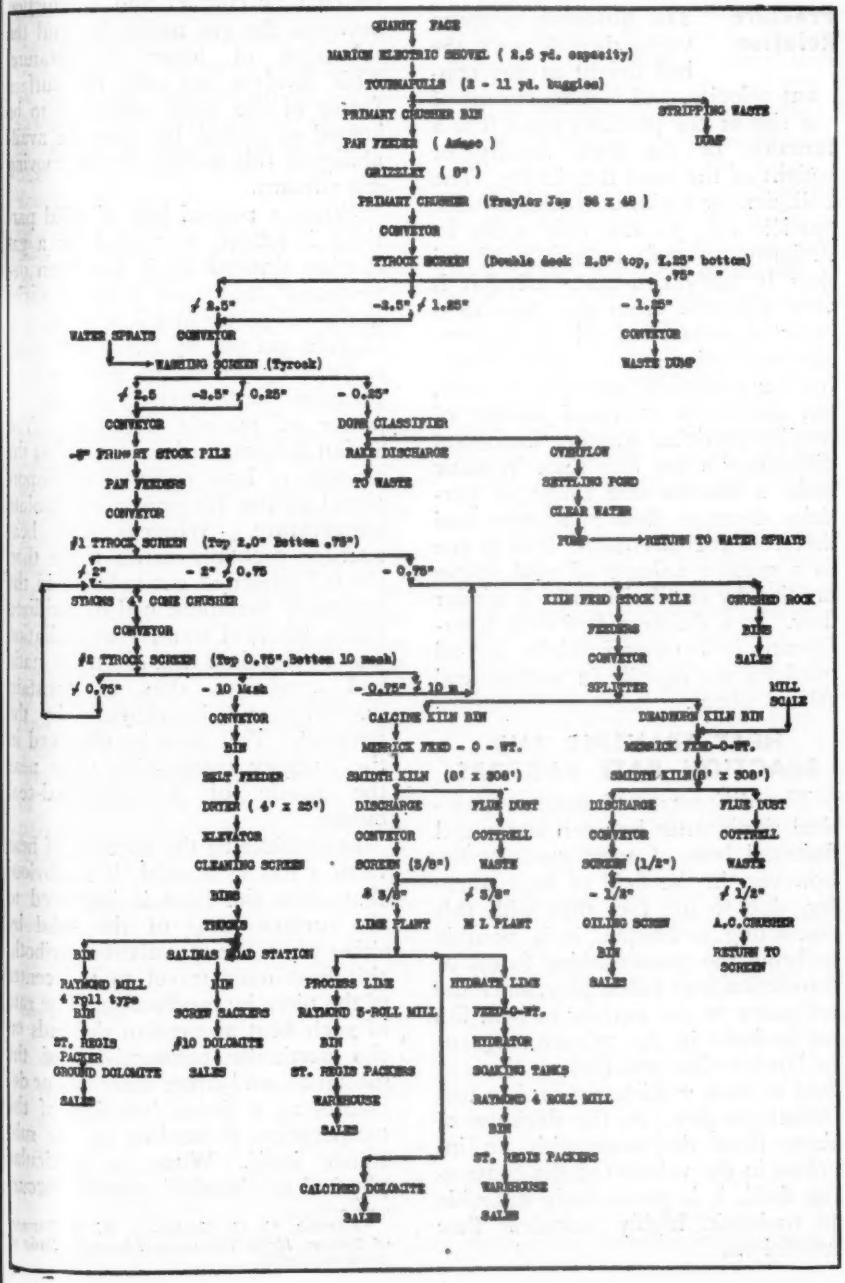
The Permanente quarry contains a gigantic deposit running into millions of tons of a very pure crystalline dolomite. The lime-magnesia ratio in this rock is very close to the theoretical dolomite ratio. Impurities consist mostly of decomposed granite dykes which, fortunately, can be easily separated by scalping and washing.

The deposit is located as a cap on the top of the hill placing the quarry well above the valley floor for economical operation. Quarry stripping is transported to a disposal dump on the side of the hill as is the undersize from the scalping operation. The rock passes through the primary crushing and screening operation at the quarry and is transported by conveyor belt to the floor of the valley where the balance of the processing plant is located.

Briefly, the processing plant consists of a primary rock stockpile, secondary crushing plant with a rock products plant as an adjunct to it, kiln-feed stockpile two calcining kilns, storage bins, a lime processing and hydrating plant, fine-grinding rock plant, and shipping warehouse.

There are also the necessary adjuncts to such a plant, namely: storeroom and parts warehouse, scale house, compressor house, machine shop and equipment repair shops, office and laboratory buildings. Capacity of primary rock equipment is about 300,000 tons per year, but this can easily be increased to meet demands.

• Flow sheet of the Natividad branch of Permanente Metals Corporation.



1. Crushed Dolomite Rock

This product is used primarily in connection with open hearth furnace upkeep in steel plants. A typical chemical analysis of the dolomite rock follows:

	Analysis Percent
Free H_2O	.20
Ignition loss (CO_2)	46.50
SiO_2	1.00
Fe_2O_3	.20
$A120_3$	.33
CaO	31.95
MgO	19.82
	100.00

Bulk Density = 96.0 lb./cu. ft.

2. Ground Dolomite Rock

This material has been used in fertilizer mixtures, in stock feeds and as a filler. A minus-325-mesh material also has been produced.

3. No. 10 Dolomite Rock

This material is used extensively as an ingredient of fertilizer mixes.

4. No. 20 Dolomite Rock

This material is used as "snow" on movie sets, and no doubt some of those beautiful snow scenes you have seen in the movies were made using screened dolomite rock. It is also used as a filler in special flooring products.

5. Calcined Dolomite (caustic burned)

This product, along with seawater, is the raw material for the manufacture of magnesia. All types of magnesia are manufactured at Moss Landing starting with a grade called "Extra Light" magnesia up through the refractory grades called Periclase which are converted into refractory basic brick at Permanente's Moss Landing brick plant. A typical chemical analysis of calcined dolomite follows:

	Analysis Percent
Ignition loss	.40
SiO_2	1.80
Fe_2O_3	.30
$A1_2O_3$	.40
CaO	59.40
MgO	37.70
	100.00

6. High-Magnesia Processed Lime

By fine-grinding the kiln-run caustic dolomite an excellent grade of

(*Continued on page 73*)

Fluidization—Its Implications for Lime and Nonmetallic Industries

Part I (Continued) Introduction to Fundamental Concepts

GAS FLOW AND PRESSURE COMPARISONS IN STATIC AND FLUIDIZED BEDS

IN a static bed of packed solids, the frictional or resistance forces for turbulent flow are commonly expressed as pressure loss or draft loss and in units such as inches of water. Such frictional resistance is inversely proportional to the size

By WOLF G. BAUER
Consulting Engineer

or surface of the solid particles, and also varies as the square of the gas velocity in the usual velocity ranges of kilns, furnaces, packed towers, heat exchangers, and the like. These flow resistant forces also vary directly with the density of the gas, this density being an inverse function of the absolute temperature for each gas. However, if we express velocity of gases not as a linear but as a mass velocity per unit cross-sectional flow area, temperature or density would not affect such calculations.

Bed Volume In a bed of fine solids of sand size it is a simple matter to measure true void space or intersticial volume. However, it has been stated by Furnas[3] that the actual cross-sectional area of a packed bed, available to the flow of gases, is only a small fraction of the total area, i.e., somewhere between 10 to 20 percent. Most of the void area is therefore inactive, as the irregular sized and packed particles cause "flow shadows", eddy pockets, and dead spaces in the immediate vicinity of the downstream surfaces. This would mean that actual linear gas velocities are quite high, and flow is turbulent. However, as we increase the gas flow to a point where lifting begins, a very distinct small drop in pressure takes place due to the sudden expansion of the flow channels. At this first point of low energy fluidization, the bed volume increases generally about 25 percent. Such fluidization can be maintained with gas volumes and pressures slightly below that initially necessary to effect a fluid bed from a static condition. We must assume, therefore, that, although lifting velocities had been reached in the passages of the static bed, no lifting took place because of an interlocking arching condition and friction due to lateral pressure against the container walls. Once this static was overcome, the gas pressure was reduced by that amount and then exerted itself only against the weight of the suspended fluidized bed.

Pressure Relation The fluidizing pressure varies directly with the bed height at any constant velocity, and is independent of the size of the particles since it is a function of the bulk density or weight of the mass it is lifting. The bulk density varies only slightly with particle size, as the void space in similarly graded materials of all sizes is fairly constant. All this is very different from gas flow in a static or packed bed, where the pressure not only increases with greater friction stemming from deeper beds, but also from increased surface of smaller particles. Another important difference is the fact that, in static beds, a narrow size range of particles decrease flow resistance, and therefore pressure drop. This is due to a greater volume of void spaces unfilled by small sizes which hinder flow. In a fluidized bed such interference is extremely slight, as all particles are equally in motion and shifted about.

HEAT TRANSFER AND REACTION RATE FACTORS

The differences of greatest practical significance between static and fluidized beds of solid particles lie, however, in the field of heat transfer, due to the fact that with this contacting technique, it is possible to bring the gas-scrubbing forces of convection into fullest play, since the resistance to the transfer of heat lies particularly in the minute stagnant or laminar flow gas films at the surface of each particle exposed to turbulent gas flow. As the thickness of these films decreases with an increase in the velocity of the contacting fluid, it is particularly desirable to maintain highly turbulent flow conditions.

Whenever we heat gases or materials directly with heat generated from combustibles, such heat exchange is accomplished with both high- and low-intensity heat. Generally, depending on the process, the high-level heat emanates as radiant heat, and may constitute half of the total quantity of heat released, whereas the low-level heat resides in the sensible heat of the products of combustion. This latter heat is carried by gases, and can only be abstracted by contact and conduction between the gas molecules and the substance of lower temperature. This involves not only the surface factor of the solid substance to be heated or cooled, but also the availability of this surface to the moving gas streams.

When a packed bed of solid particles is heated or cooled by a gas flowing through it, it has been determined[4] that heat transfer varies as the 0.7 power of gas velocity, (cu. ft. cold gas per sq. ft. of bed area) as the 0.3 power of the absolute temperature, and inversely as the 0.9 power of particle diameter. The Stefan Boltzmann law states that the amount of heat radiated is proportional to the 4th power of absolute temperature. Whereas the heat transfer probably varies more than the 0.7 power of gas velocity in the extremely turbulent bed of fluidized solids, the heat transfer by radiation may be less than that given for static bed conditions due to constant screening and interference by the particles. This may be observed in the primary combustion zone near the nozzle of a powdered-coal burner.

In considering the transfer of heat from a gas to a solid, it is obvious that after the heat is imparted to the surface layer of the solid by either convection, radiation, or both, this heat must travel to the center of the piece by conduction. The rate of such heat absorption depends on the particular conductivity of the substance, and either increases or decreases as a linear function of the temperature, depending on the substance itself. When a particular physical or chemical reaction occurs

[3]Furnas, C. C., *Bulletin*, U. S. Bureau of Mines, *Flow of Gases Through Beds of Broken Solids.*

[4]Furnas, C. C., *Bulletin*, U. S. Bureau of Mines, *Heat Transfer Through Beds of Broken Solids.*

at the advancing isothermal heat plane from the surface to the interior of the piece, the rate and total time of such a reaction is a function of various factors, such as the temperature gradients behind the heat plane, the partial pressure of gases around and within the particle, and the size, shape and porosity of the particle. Taking as an example a calcination process such as the removal of combined water from clays or bauxite, the carbon dioxide from a carbonate, or the sulfur dioxide from a sulfate,—such calcination proceeds from the surface to the center at a constant rate, depending in part on the temperature at the interface of the reaction zone plane within the particle.

Static vs. Fluid Bed Comparison In comparing heat transfer and reaction rates of solids under influence of heated gas streams in static and fluid beds, it would be more consistent if we based our comparison on similar gas-flow rates per mass of solids to be treated, as the amount of gas and heat is necessarily fixed by the particular process. If we were to use, for example, spherical particles of 1 inch diameter in a packed column and passed gases through this bed at an arbitrary rate of 1 cubic foot per second per square foot available flow area, allowing such a bed to move continuously downward on the counter-current principle, these particles would have to remain in the column for a length of time sufficient to be treated throughout their mass. If this rate of treatment, such as the dissociation of a molecularly held gas from a metal or oxide, is 1 inch per hour penetration at a certain mean temperature, it would theoretically require ½ hour from the time such temperature is reached to completely reduce, oxidize, calcine, dry, or treat the material. Since beds of closely-sized particles contain approximately the same weight of material per volume, be these particles large or small, we may now determine the minimum size of particles of the same substance which can be fluidized by the same gas flow necessary in the static bed. Under the previously given conditions, this minimum size would be approximately 0.003 inches in diameter, and instead of requiring 30 minutes to complete the process throughout each particle, the time would now be 5½ seconds. This would be accomplished with practically the same cross-sectional bed area, and points at once to the increased production rate per unit that the fluidization column enjoys over a static bed column in which gas velocities but not pressures are equal. (See Table I.)

In the static bed, each particle has to remain under the influence of hot gases until the very last center core has been chemically changed, despite the fact that most of the mass has already been converted in the outer layers of each particle. Whereas the linear dissociations progress is constant, the weight or volume dissociated in a particle decreases with the linear penetration. This rate depends on the shape of the particle. For spherical or cubical shapes, ½ of the particle has already been processed or converted when only 1/5 of the total treatment period has elapsed. Beside this time saving element, there are other advantageous features in a fluidized bed of fine particles over the ordinary static bed of coarse sizes, such as absence of channeling, uniform heat distribution, and possibilities for more exacting temperature control.

It may be surmised by the reader that due to the tremendous surface areas exposed to convection and even conduction between constantly colliding particles, that the heat transfer rates for any set of conditions are of much higher value than those attained in static beds of necessarily larger size particles, and approach, in fact, those encountered with liquids. Due to the fact that heat transfer in static beds of broken solids varies as the 0.7 power of gas velocity as against the 0.3 power of absolute temperature, it would appear that those processes where heat is exchanged directly by forced convection will be particularly favored by the application of the fluidization technique. There is likely to be a critical velocity and size relationship in heat transfer by convection near the sudden change from turbulent to laminar flow beyond which a further decrease in particle size will have less effect than a comparative reduction in size where gas flow is Newtonian.

Transfer of radiant heat between gas and solid in a fluidized bed is probably high. However, in actual practice, high radiant heat is not developed to the same extent that it might be in a static bed of coarse particles. This is due to two effects, the blanketing effect of the cloud of particles screening and interfering with the path of the rays, and the cooling effect which is very rapid in the zone of heat origin by combustion, inhibiting development of high temperatures. These two factors work together in reducing luminosity and high radiant energy. The cooling effect is probably somewhat analogous to that which obtains in submerged combustion in liquids, where heat transfer is rapid, but not by radiation. A further effect may be deduced from the fact that the high gas turbulency causes such rapid mixing of oxygen and combustible, that prolonged partial combustion with its promotion of luminous carbon particles, is reduced to a minimum. The cooling effect of the solid phase in the zone of combustion (i.e. in a system where the combustible and burning gases are also the fluidizing gases) is especially pronounced where an endothermic reaction like lime calcination takes place during the heating of the solid phase.

TABLE I
Calcination Time of Small Particles of Limestone (Min. & Seconds)

Size in Inches	¼	⅙		⅛	1/12		1/24	1/35					
Mesh	3	4	6	8	10	14	20	28	48	65	100	200	325
Temperature													
1700°F.	48	33	22	18	11	8.6	6.0	3.7	1.8	1.5	1.1	33	18
1800°F.	32	22	15	12	7.7	5.7	4.0	2.5	1.2	1.0	45	22	12
1900°F.	23	16	10	8.8	5.3	4.0	2.8	1.7	52	42	31	16	8.4
2000°F.	14	10	6.7	5.5	3.3	2.5	1.8	1.1	33	26	20	10	5.3
2100°F.	9.3	6.4	4.3	3.6	2.1	1.6	1.1	43	21	17	13	6.4	3.4
2200°F.	6.2	4.2	2.8	2.4	1.4	1.1	45	28	14	11	8.5	4.3	2.2
	Minutes ..... Seconds												

CLASSIFICATION OF FLUIDIZATION SYSTEMS ACCORDING TO FLOW

The technique of treating gases or solids by fluidization is yet too new and recent to have acquired adequate terminology to lend expression to its many technical phases and aspects. As more investigators evolve and perfect new processes, methods, and devices dealing with fluidization, we should observe more terms and standard classifications in the increasing volume of technical literature that is bound to appear.

Before a few observations are made on design problems that will

appear in industrial applications, a few words may be said about the relative merits of the three main types of fluid systems mentioned earlier. The illustrations depict the mechanism schematically, and indicate the process from the standpoint of heat treating materials. It should go without saying that similar designs would conversely treat the gas instead of the solid phase. In the latter case, the solid phase would be either inert, or act as catalyst, thus widening the scope of the technique.

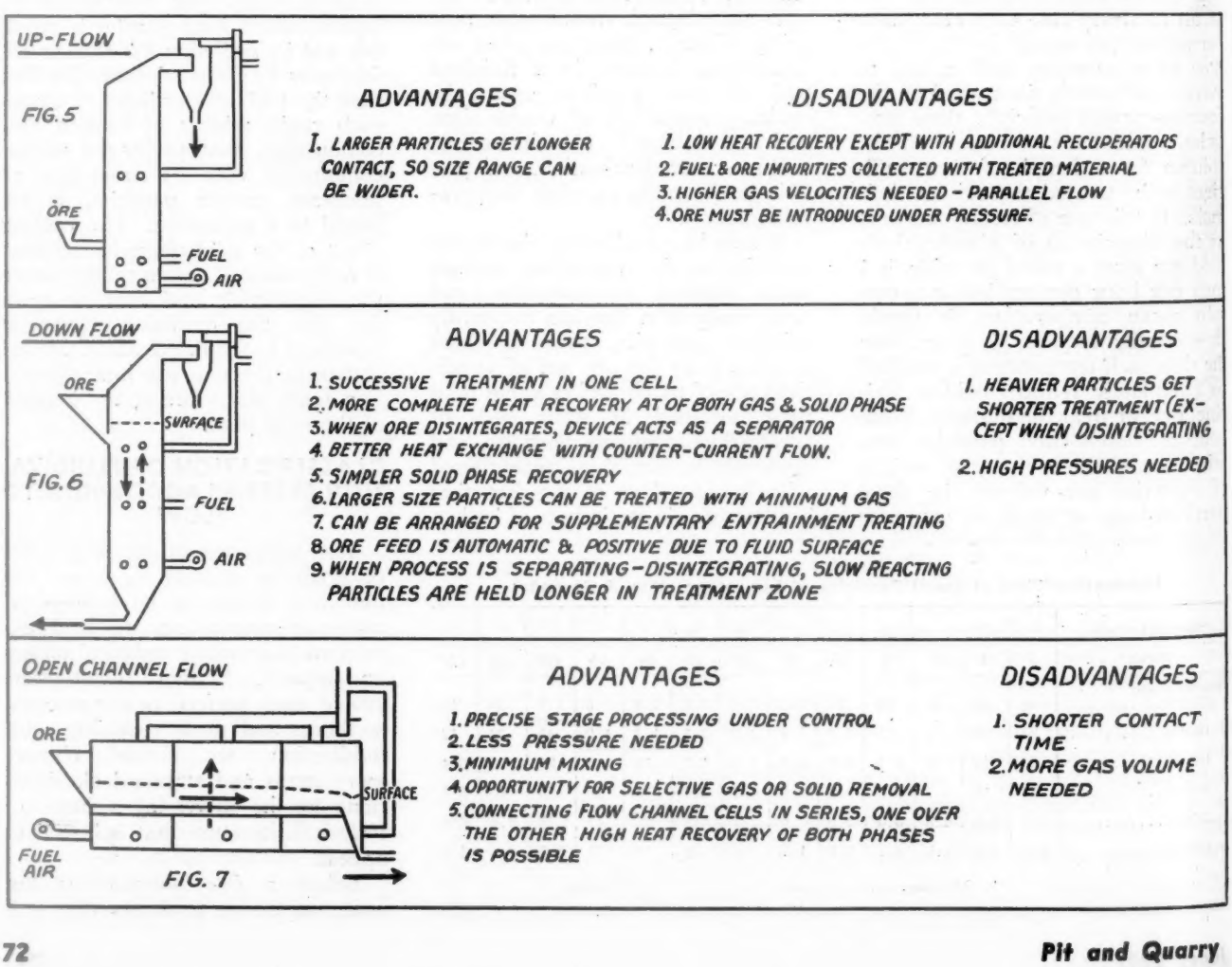
Up-Flow Systems Up-flow systems, as illustrated schematically by Figure 5, incorporate laterally restricted high columns, involving high pressures and subsequent cyclonic gas-solid separation. They are distinguished from down-flow and open-channel flow by absence of a fluidized bed surface. It should be remembered that we are not dealing here with catalyst recycling but with more heat-treating adaptations. Note that in up-flow, both gas and solid phase move unidirectionally, although at different velocities.

Down-Flow Down-flow (Figure 6) fluidization allows somewhat different solid phase introduction, gas-solid separation, and better, more distinct heat recuperation. The lower cone portion is filled with a static bed acting as an air seal but moving slowly by gravity out of the column. Note that gas flow here is counter current to solid phase which moves downward. There are two distinct causes of down-flow of a deep fluidized bed or column past the level of gas introduction above the static bed portion. The first causes movement because of the fact that particles in fluidized or "teeter" condition move themselves both up and down. When a particle moves down past the fluidizing gas entrance level because space exists below this level, it cannot again move up because of lack of a lifting gas current. When a multitude of such particles are so removed at the bottom of the fluidized column, the gas velocity in this depleted zone is decreased due to less constriction, and particles immediately above sink through this low velocity zone until it again becomes constricted with sufficient particles, whence its velocity again reaches lifting velocity. This effect actually is one of successive infinitesimal velocity changes advancing upward as a wave.

The second cause for down flow may lie in a fluidizing velocity which, if the bed were fixed, as on a grate, would be insufficient to fluidize the solid phase. However, since the bed is itself moving downward, we actually obtain what is called "hindered settling". In such a case the actual upward velocity of the fluidizing gas is less than that ordinarily necessary for even low-energy fluidization, but the *relative* velocity between gas and settling particles is the same, and therefore produces fluid condition and agitation of a descending column of solid phase.

Open-Channel Flow Open-channel flow (Figure 7), as introduced by the writer, is more adaptable to processes carried on at elevated temperatures and lower pressures. Relative movement is such that the solid phase moves laterally across or at right angles to up-flowing gas, or at cross-current. Movement of solid phase takes place in a narrow channel, the

Figs. 5, 6, 7. Comparison of up-flow, down-flow and open-channel flow systems.


UP-FLOW
FIG. 5
ORE
FUEL
AIR
ADVANTAGES
1. LARGER PARTICLES GET LONGER CONTACT, SO SIZE RANGE CAN BE WIDER.
DISADVANTAGES
1. LOW HEAT RECOVERY EXCEPT WITH ADDITIONAL RECUPERATORS
2. FUEL & ORE IMPURITIES COLLECTED WITH TREATED MATERIAL
3. HIGHER GAS VELOCITIES NEEDED – PARALLEL FLOW
4. ORE MUST BE INTRODUCED UNDER PRESSURE.
DOWN FLOW
ORE
SURFACE
FIG. 6
FUEL
AIR
ADVANTAGES
1. SUCCESSIVE TREATMENT IN ONE CELL
2. MORE COMPLETE HEAT RECOVERY AT OF BOTH GAS & SOLID PHASE
3. WHEN ORE DISINTEGRATES, DEVICE ACTS AS A SEPARATOR
4. BETTER HEAT EXCHANGE WITH COUNTER-CURRENT FLOW.
5. SIMPLER SOLID PHASE RECOVERY
6. LARGER SIZE PARTICLES CAN BE TREATED WITH MINIMUM GAS
7. CAN BE ARRANGED FOR SUPPLEMENTARY ENTRAINMENT TREATING
8. ORE FEED IS AUTOMATIC & POSITIVE DUE TO FLUID SURFACE
9. WHEN PROCESS IS SEPARATING-DISINTEGRATING, SLOW REACTING PARTICLES ARE HELD LONGER IN TREATMENT ZONE
DISADVANTAGES
1. HEAVIER PARTICLES GET SHORTER TREATMENT (EXCEPT WHEN DISINTEGRATING
2. HIGH PRESSURES NEEDED
OPEN CHANNEL FLOW
ORE
SURFACE
FUEL
AIR
FIG. 7
ADVANTAGES
1. PRECISE STAGE PROCESSING UNDER CONTROL
2. LESS PRESSURE NEEDED
3. MINIMUM MIXING
4. OPPORTUNITY FOR SELECTIVE GAS OR SOLID REMOVAL
5. CONNECTING FLOW CHANNEL CELLS IN SERIES, ONE OVER THE OTHER HIGH HEAT RECOVERY OF BOTH PHASES IS POSSIBLE
DISADVANTAGES
1. SHORTER CONTACT TIME
2. MORE GAS VOLUME NEEDED

bottom of which is composed of a grate or series of cross-ducts above a solid bottom, and walls are diverging upwardly. Material feeds in by gravity against the "hydrostatic" pressure of the fluidized bed, the dep h and pressure of which is controlled by the discharge feeder below the static column air seal in the last chamber. The long narrow channel is partitioned both above and below the grate to facilitate stage processing control, the solid phase being made to flow under the submerger baffles. Flow along the channel is due to difference in height between inlet and outlet section of the bed, creating a "hydrostatic" head forcing the pseudo-liquid along the channel in a slow and controlled current. See also the illustration in Figure 8, which is a photograph of a fluidized bed in open-channel flow.

Of the other systems previously mentioned, fixed-bed fluidization involves no relative translation of solid phase, alternate treating of gas, relegating this to a batch or cyclic process. Lateral flow fluidization through pipes and ducts is actually a type of entrainment at high solid phase density, using both gas and mechanical propulsion to cause flow. It is used at present for conveying all types of fine and granular material.

DESIGN CONSIDERATIONS

Choice of type and design of operating units hinge not only on the process and what must be accomplished, but also on the limits set by available volumes of fluidizing and treating gases, necessary time and exposure factors which involve fluid bed depth and pressures, range of solid phase particle sizing, physical and chemical nature such as hardness, abrasion resistance, specific heat, refractoriness, etc., of solid phase, along with a host of considerations involving the economics of a particular operation.

As an illustration, we may find that in a certain process of heat treating an ore, the volumes of gases from the products of combustion are insufficient to fluidize particles for a sufficient length of time. This may then involve a decrease in particle size of solid phase to lower fluidizing velocities; a decrease in bed area and an increase in bed depth at expense of higher pressures and power consumption; or a recycling of hot waste gases to increase gas flow. If the process is "disintegrating", that is to say, if the solid phase changes in specific gravity or size such that when it has been reacted upon by the gases (as steam on quicklime forming fine hydrate, or heat on expanding cereals or minerals) the particles so reacted will be carried out of the fluidized bed of unreacted material by entrainment, then the fluidization system or unit may also act in the nature of a separator of treated from untreated material. In such systems, further gas treatment can be given the entrained product during its passage out of the system.

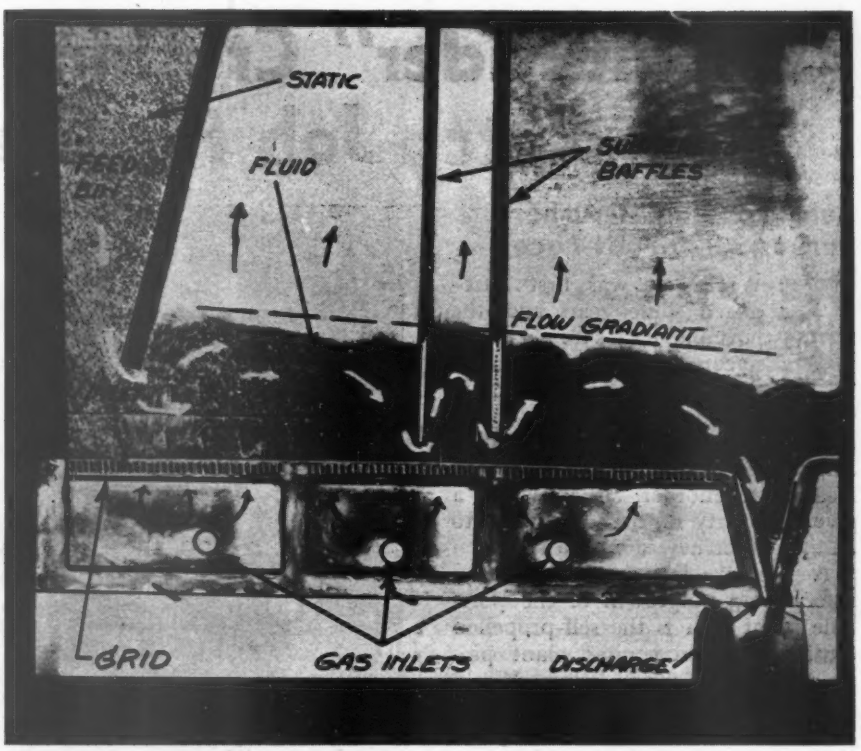


Fig. 8. A photograph of a fluidized bed in open-channel flow.

From a purely economic standpoint, we must count process continuity, temperature and treatment control, automatic mechanical straight line movement, mechanical simplicity, unit compactness, thermal or treatment efficiency, and time of reaction as distinct advantages. Power costs and size of raw and finished material might be determining factors adversely influencing economics and suitability.

In a following future issue, the subject of fluidization as it applies more directly to lime processing will be taken up. Initial pilot plant tests in calcining stone have been very promising so far, and commercial testing is under way at present to obtain the necessary economics' factors for the whole operation. There are quite a number of unrelated process phases of lime manufacture in which this tool may be applied, and these will be discussed as test results become available.

(To be continued)

Convert Permanente Plant

(*From page* 69)

"hot" lime is produced. This product has found wide acceptance throughout the whole Pacific slope for use as a building lime and is shipped to points as far away as New Mexico and the state of Washington. It is also used in a number of chemical processes, for example in paper manufacture and insecticide sprays.

7. High-Magnesia Hydrated Lime

By hydrating the kiln-run caustic dolomite, an excellent grade of hydrated lime is also produced. Like processed lime, it has found wide acceptance in the building industry and also has a number of successful chemical uses such as a dusting agent for insecticides and in the tanning industry.

8. Deadburned Dolomite.

Before 1944 there was no deadburned dolomite manufactured on the Pacific Coast. At that time production was started at Natividad. Ordinarily a crystalline rock which has a tendency to decrepitate on calcining would not be used for the manufacture of this product. By careful control of calcining conditions, however, a satisfactory product is made which is used by practically all of the steel plants on the West Coast and is shipped as far as Utah.

All products leave the plant by truck, either direct to the user or to the company's Salinas loading station. At this point there are complete storage and loading facilities located on the main line of the Southern Pacific railroad between San Francisco and Los Angeles.

"Circuit Rider" Crushing Plant Does Top-Notch Job for Gravel Producer

Self-Propelled Crusher Serves 3,000-Foot Face

another ON THE SPOT report

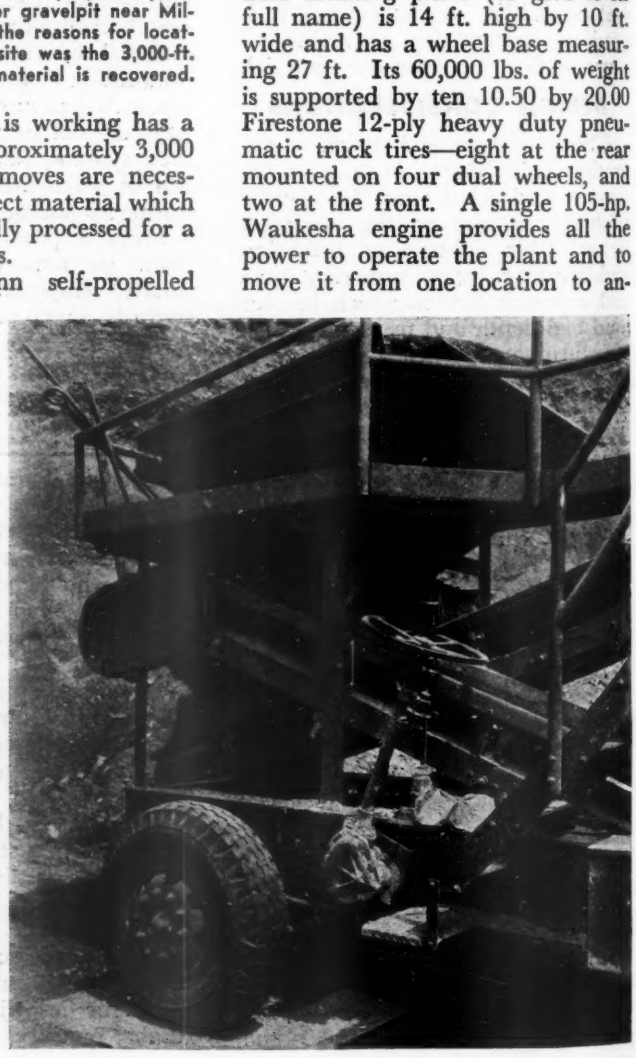
WHEN it was first introduced some years ago, the portable crushing and screening plant was something of a nine days' wonder. Here, one thought, is the ultimate in efficiency—a plant which can readily be transported from one location to another, either within a given property or over highways to an altogether new site.

A logical, but in many ways astonishing, outgrowth of the portable plant idea is the self-propelled crushing and screening plant pioneered, a few years before World War II, by the Lippmann Engineering Works. As the name implies, the self-propelled plant, which is a complete self-contained unit on a single chassis, can take to the open highway on a moment's notice and cruise at 30 miles per hour, or it can, with equal facility and dispatch, follow the shovel from point to point within a particular deposit.

Curious to see the self-propelled plant in actual operation, we availed ourselves recently of an invitation to visit the George J. Bahler sand and gravel plant located near Milwaukee, Wis., where the first plant of this type ever built has been in continuous service since 1939. The idea of the self-propelled plant appealed strongly to Mr. Bahler because the face he is working has a total length of approximately 3,000 ft., and frequent moves are necessary in order to select material which may be economically processed for a wide range of uses.

• A general view of the self-propelled plant at the George J. Bahler gravelpit near Milwaukee, Wis. One of the reasons for locating the plant at this site was the 3,000-ft. face from which the material is recovered.

This Lippmann self-propelled dual crushing plant (to give it its full name) is 14 ft. high by 10 ft. wide and has a wheel base measuring 27 ft. Its 60,000 lbs. of weight is supported by ten 10.50 by 20.00 Firestone 12-ply heavy duty pneumatic truck tires—eight at the rear mounted on four dual wheels, and two at the front. A single 105-hp. Waukesha engine provides all the power to operate the plant and to move it from one location to an-



• Right: This particular model is steered manually, but the latest machines incorporate hydraulic steering and also provide a more comfortable perch for the driver.

• Below: A view of the 105-hp. engine and the 12- by 36-in. jaw crusher.

other. The four-dual-wheel tandem drive has four forward speeds and one reverse, enabling the plant to barrel along at 25 or 30 miles per hour on the highway or crawl at a snail's pace when maneuvering in close quarters. Four-wheel air brakes provide for quick stops.

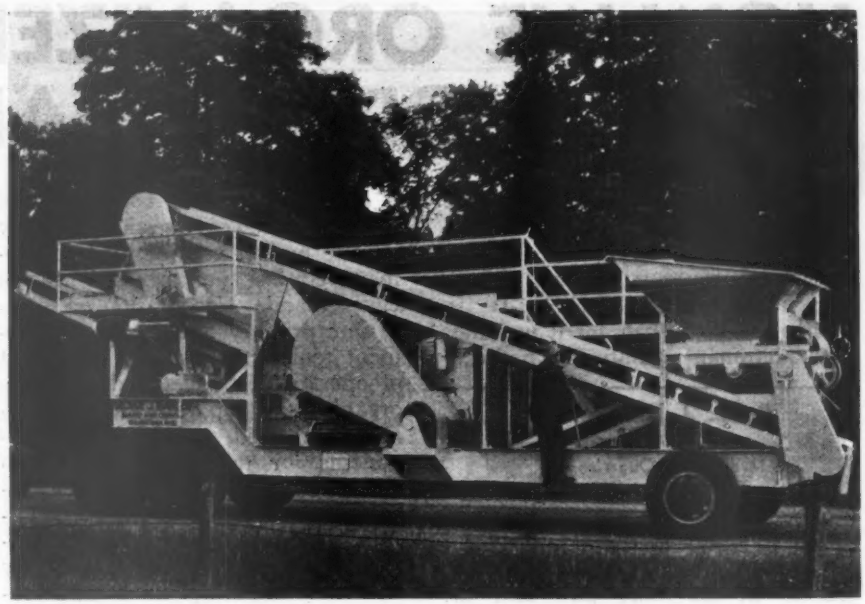
The crushing unit on the Bahler plant is a dual or two-stage setup—a primary consisting of a 12- by 36-in. Lippmann jaw crusher, and a secondary consisting of a 30- by 20-in. Lippmann two-roll crusher. The secondary crusher is arranged in closed circuit with a two-deck 4- by 9-ft. vibrating screen. Other major equipment mounted on the chassis includes a 24- by 40-in. adjustable reciprocating plate feeder, a 24-in. by 30-ft. feed conveyor, a 20-in. by 24-ft. return conveyor and a 30-in. by 20-ft. delivery conveyor.

At the Bahler pit the 3-cu.-yd. feed hopper is loaded with a Koehring 304 gasoline-powered shovel. Although the plant can readily eliminate an excessive amount of sand in the bank-run material, the usual practice is to control this factor by operating in the portion of the deposit containing approximately the desired proportion of fines. Since the company's sales consist largely of crushed bank-run material, the economic advantage of being able to shift quickly from location to location is self-evident.

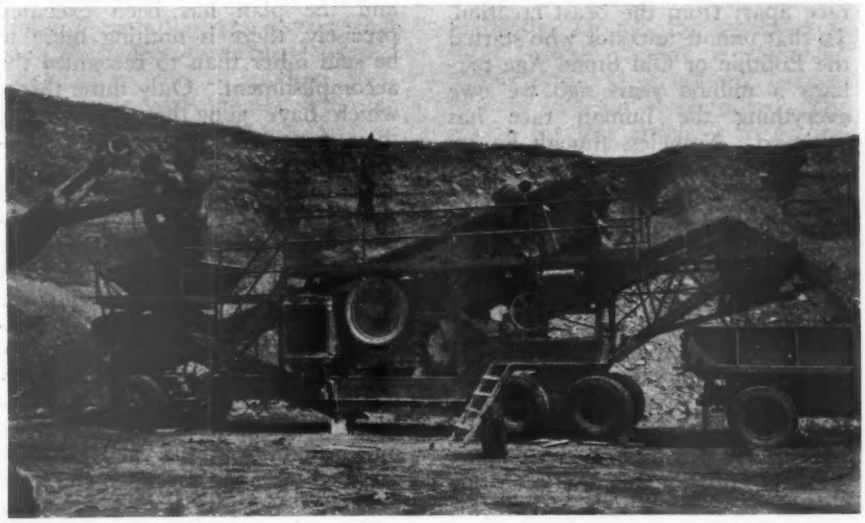
As a general rule it is unnecessary to move the plant oftener than once a day, and although shifts seldom require more than five minutes to execute, they are usually made after the day's run has been completed. No effort is made to grade the floor of the pit, since the plant is adequately powered for maneuvering over any ordinary obstacles that might be encountered. According to Mr. Bahler the power reserve is sufficient to permit starting the plant under full load; *i. e.*, with the feeder, both crushers, the screens and the conveyors completely loaded. This is an important factor, since there is only a 1½ cu-yd. hopper at the discharge end of the plant to receive finished product between the departure of a loaded truck and the arrival of an empty one.

The self-propelled dual plant has a rated capacity of 60 cu. yds. per hour, but output in the Bahler pit averages closer to 100 cu. yds. of ¾-in. material per hour, probably due to the fact that the pit-run ma-

(*Continued on page* 80)



• This view shows the Bahler plant on its sole highway excursion on the day it was delivered. Weight is distributed to hold the maximum wheel load to approximately 6,000 lbs.



• A closeup of the duo plant, showing bank-run material going into the feed hopper on the left and finished material discharging into the truck on the right.

• A view of the four duo-wheel tandem drive assembly which carries the major part of the 60,000-lb. load. Tires are 10.50 by 20.00 12-ply heavy-duty.

HOW WE ORGANIZED FOR MODERN MANAGEMENT

By E. J. KAUFMAN
General Manager
Marble Cliff Quarries Co.,
Columbus, Ohio

WE who operate pits and quarries today can take deep and lasting pride in the fact that ours is the oldest of all *human* enterprises. It is even more than that, for it was the first subhuman primate who had the vision to select in some prehistoric pit a piece of flint shaped more or less to fit his hairy paw and to pound and shape it into the first hand axe, who—founding our business—in that moment set the human race apart from the beast creation. To that remote ancestor who started the Eolithic or Old Stone Age perhaps a million years ago we owe everything the human race has achieved. Nameless though he be, without him humanity might be as the gorilla, the chimpanzee, the baboon, and the gibbon—just another genus of the primates, huddling in caves or trees against the weather and eating wild fruits and berries, insects, and whatever grain and game came to his bare hands.

The fact that our industry is the fountainhead of all progress and that it was the means by which the human race was made a thing apart does not entitle us to rest upon our laurels. On the contrary, it seems to me that it imposes upon us the obligation to remain always in the forefront of progress. The most direct and practical way I know of to do this is to improve the means of modern management control in our own businesses so that we can produce the mineral wealth needed at prices favorable to customers, with reasonable wages to labor and satisfactory earnings for ownership and management.

As I see it, modern management control is all-embracing, including such elements as organization, finance, production, sales, performance standards and incentives for reduction of standard costs research, and especially accounting control through and with strong budgetary control. Obviously, to discuss each of these problems in relation to quarry operation would require not a book but a set of books, which I have neither the time nor the inclination to write. Consequently, I shall confine myself to the narrower question of how we use budget control for management control purposes at Marble Cliff Quarries Corporation.

Our primary and basic management tool is a combined statement of operations, budget and variance, organized to separate clearly variable, semi-fixed, and fixed cost components for management-by-exception. As I define it, management-by-exception is management downward from the general to the particular with responsibility, authority and accountability fixed and coordinated. This puts the major emphasis on *variance*. After all, if a certain thing has been planned and the plan has been executed precisely, there is nothing more to be said other than to recognize the accomplishment. Only those things which have gone better or worse than expected need further consideration.

These are the exceptions that need management. When the actual expenditure or cost per unit exceeds the budget, it is important to get at the root of the matter to discover the reasons and the means of preventing their recurrence. As some wise old Frenchman has said, "Perfection can be sought but not attained." It is necessary to pay as much attention to the variances that are favorable as to those that are adverse. The proper understanding of how the unusually favorable results came about may suggest new methods or modification of the old ones that can be used to reduce standard costs.

The accompanying basic statement blank, designed in conjunction with and printed for us by Remington Rand Inc., is detailed enough to give us a complete monthly review of our operations uncluttered by confusing and unimportant subsidiary details *at this point*. Those which are important in understanding the reasons for a variance we can select from subsidiary reports.

Sales are the starting point of every business, and so the top of our statement compares actual with budgeted sales by major classes. Our budget figures are entered well in advance, for we work out our monthly budgets based on our sales forecasts several months ahead. Our sales forecasts are made on our estimates of probable business conditions in the light of past experience, giving effect to our knowledge of customers' contracts in hand. Next we have a five-line recapitulation of activity—tonnage sold, in inventory, produced, and rehandled. From the first and the last line we calculate our percentage of sales rehandled, which is an operating ratio of prime importance to a satisfactory profit showing. Variance in this ratio comes in for the closest scrutiny.

The balance of the statement analyzes and budgets costs and actual operating figures with their variances, *in total and per ton*. This statement differs from conventional accounting reports because it was worked out to be a management tool and not merely a historic record useful chiefly for tax statement preparation. As mentioned above, it makes a clean separation of the three kinds of expenses: variable, semi-variable and fixed. Each of these is broken into two types: labor and materials or supplies. These are again broken down by type of labor operation or kind of supply, so that one can really grasp the nature and amount of each budget amount, actual amount and variance. There is none of the confusion that makes many operating statements so difficult to use, because essentially different kinds of expense are lumped together under a single head. The total factory costs can be seen for what they are.

A significant variation is spotted immediately, whether it be on a per ton or a total basis. Then it is a matter of running down the subsidiary accounts and questioning the supervisory personnel having first-hand knowledge to get at the facts which explain the variance. Administration direct is also shown.

The next section is an analysis of cost of sales broken down by item, with indirect selling and administrative expense included. Thus, we have a profit-and-loss statement organized so that we can be intelligent about results and can focus our attention in constructing future budgets and in determining the efficiency of their execution on things that can be *known, understood and managed*.

The reverse side of this form is a tonnage report, also set up on the same plan of showing budget, actual and variance. All production and its distribution is shown. Sup-

OPERATING STATEMENT, BUDGET AND VARIANCE — MONTH OF

SALES	PER TON	ACTUAL CURRENT MONTH	ACTUAL YEAR TO DATE	PER TON	PER TON	BUDGET CURRENT MONTH	BUDGET YEAR TO DATE	PER TON	PER TON	VARIANCE CURRENT MONTH	VARIANCE YEAR TO DATE	PER TON
FLUX												
BALLAST												
ROAD, CONCRETE, ETC.												
SAND												
QUARRY RUN												
TOTAL												
DEPARTMENTAL TRANSFERS												
—TOTAL SALES												
		CURRENT MONTH	YEAR TO DATE			CURRENT MONTH	YEAR TO DATE			CURRENT MONTH	YEAR TO DATE	
1—TONS—SOLD												
2— " —INVENTORY												
3— " —PRODUCED												
4— " —REHANDLED												
% SALES " 4÷1												

COSTS	PER TON	ACTUAL CURRENT MONTH	ACTUAL YEAR TO DATE	PER TON	PER TON	BUDGET CURRENT MONTH	BUDGET YEAR TO DATE	PER TON	PER TON	VARIANCE CURRENT MONTH	VARIANCE YEAR TO DATE	PER TON
STRIPPING LABOR												
DRILLING "												
SHOOTING "												
LOADING "												
HAULING "												
CRUSHING "												
VARIABLE "												
POWDER												
EXHAUSTION												
ROYALTY												
VARIABLE EXPENSE GROUP												
TRACK LABOR												
GENERAL "												
MUD "												
EXTRAORDINARY "												
REPAIR "												
SEMI-VARIABLE "												
FUEL												
OIL, GREASE AND WASTE												
EXTRAORDINARY MAT'RLS												
REPAIR "												
SEMI-VARIABLE MAT'RLS												
SEMI-VARIABLE EXP. GROUP												
POWER LABOR												
FIXED NON. PRO. "												
QUARRY OVERHEAD "												
FIXED "												
TEAMING EXPENSE												
DEPRECIATION												
FIXED EXPENSE GROUP												
3—TOTAL MFG. EXPENSE												
2—INVENTORY COST												
1—TOTAL MFG. COST												
4—REHANDLING EXPENSE												
1—TOTAL												
FACTORY DIRECT												
TOP STONE DUMPING												
TOTAL FACTORY COSTS												
ADMR. DIRECT												
1—COST OF SALES												
GAIN OR LOSS—STONE M. C.												
" OR " WASTE STONE M.C.												
" OR " BY-PRODUCTS M.C.												
" OR " GRAVEL & CONCR												
" OR " PORT COLUMBUS												
" OR "												
" OR " LEWISBURG												
ADM. & SELL. —INDIRECT												
MISCELLANEOUS												
GAIN OR LOSS—TOTAL												

• Basic statement blank used by the Marble Cliff Quarries Co.

plementing this on the same page we have our analysis of repair or maintenance expense again broken down to labor and material items, with an accounting of by-products and of miscellaneous and non-recurring gains and losses.

At first blush there may not seem to be anything very remarkable about a two-page operating and budget report. It is only by using it, after having used the conventional operating statement designed by men who are accountants first and operating men second, that one can come to appreciate what a revolutionary tool of modern management we have created with the aid of Remington Rand's Systems Division. Instead of having to dig around or conjecture whether a change or variance—whether good or bad—was in a fixed, a semi-variable, or a variable component of a labor or material item, we know immediately. Hence, instead of having to play guessing games, we are able to go at correcting weaknesses that are revealed in our variance figures in the same spirit and with the same certainty that an engineer solves an equation.

As a matter of fact, what we have done is to reduce budgets and operating statements to very simple equations. We have our "x's" and "y's" and "z's"—our fixed, our semi-variable and our variable costs—clearly separated and cleanly labeled, so that we can talk about sheep and cattle and hogs, so to speak, instead of having to talk merely about "white livestock" and "other than white livestock" (labor and materials) without knowing for sure whether we are discussing sheep or cattle or hogs.

This is a tremendous advance in modern management control. If you will take the trouble to do a little experimenting with the profit equation in its general form, you will find out just how revolutionary this is; or you can get in touch with Remington Rand and have this demonstrated for you. The profit equation is a key tool of modern management, but it is extremely simple to use. It merely states the obvious fact that net sales less fixed costs less direct costs less the direct and variable portions of semi-variable costs less profit (or plus loss, which is the same thing mathematically, though far different to those whose capital is invested) equals zero. It is not my purpose to drag in a lot of formulas. The reason for this article is to lay before readers of PIT & QUARRY some of the advantages that I feel I have gained through modern management control methods, in the hope that others will find ideas that they can employ profitably in their own businesses.

Some very striking things emerge from consideration of the profit equation. I know it is my natural inclination, and I suspect that many other quarry operators share it with me, to try to "keep expenses down" and to hesitate long and debate the pro's and con's thoroughly before making substantial investments in equipment. If what men think can be judged by what they do, it seems safe to say that many management men share the tendency to employ additional personnel to cope with peak loads rather than to reorganize methods and buy new equipment.

The profit equation—as one can speedily prove for himself—shows that the facts are otherwise. "Keeping expenses down," that is, keeping fixed costs relatively low, is expensive in the long run. Sometimes, as in recent years when equipment simply has not been freely procurable, one has to do it; but doing something as a matter of necessity is quite different from doing it as a matter of choice. It is always good business and good sense to convert a variable into a fixed cost or into a semi-variable cost with as large as possible a fixed compo-

TONNAGE RECORD — MONTH OF

	ACTUAL		BUDGET		VARIANCE	
	CURRENT MONTH	YEAR TO DATE	CURRENT MONTH	YEAR TO DATE	CURRENT MONTH	YEAR TO DATE
FLUX						
BALLAST						
ROAD, CONCRETE, ETC.						
SAND						
QUARRY RUN						
TOTAL						
TO LIME PLANT						
" ASPHALT "						
" PULVERIZER "						
" EAGLE MILL "						
" AGR. MEAL						
" PORT COLUMBUS						
TOTAL TRANSFERS						
TOTAL SALES						
INVENTORY						
TOTAL PRODUCTION—SALEABLE						
WASTE						
TOTAL REMOVED						
REPAIR—LABOR						
DRILLS						
SHOVELS						
LOCOMOTIVES						
CARS						
CRUSHING						
TRACK						
GENERAL						
TOTAL						
REPAIR—MATERIALS						
DRILLS						
SHOVELS						
LOCOMOTIVES						
CARS						
CRUSHING						
TRACK						
GENERAL						
INVENTORY						
TOTAL						
LEWISBURG						
STONE						
LIME						
MEAL						
WASTE						
RIP RAP						
TOTAL						
BY-PRODUCTS AND MISCELLANEOUS GAINS & LOSSES						
LIME PLANT						
" PURCHASED						
ASPHALT PLANT						
" PURCHASED						
PULVERIZER PLANT						
AGRICULTURAL MEAL						
AGRICULTURAL MEAL PURCHASED						
BUILDING STONE						
RIP RAP						
TOTAL BY-PRODUCTS						
DWELLINGS FULTONHAM						
" M. C.						
" LEWISBURG						
DISCOUNT EARNED						
INTEREST "						
" PAID						
SUNDRY						
SCRAP SALES						
TOTAL MISCELLANEOUS						

• The tonnage report appears on the reverse side of the basic statement blank.

nent, if the fixed or semi-variable cost at *the break-even point* is not larger than the equivalent variable cost at that point. It is often good business, even if the fixed cost is appreciably larger, provided that the business normally operates above the point of equivalent volume giving effect to the change in break-even point that will follow the conversion. This is a question of judgment based on experience and one's forecast of the outlook for the section of the country in which he operates. If one expects predominantly good business during most of the years during which the fixed cost can be written off, then it is smart to let (fixed) expenses rise in order to keep down variable costs. The reason is obvious. A variable cost rises with each additional ton quarried and sold, so that profit remains constant; but a cost once fixed declines proportionately for each successive ton above the break-even point, and so *profits grow much faster than tonnage.* There is also an indirect advantage. Men work better and produce more with tools of which they are proud, and so a management that has a reputation with its labor gangs of providing good equipment draws and holds better workmen who give a better day's work for a day's pay. None of us can longer doubt the importance to management and ownership of doing everything that is commercially practical to make labor feel contented and satisfied that management is treating men as well as it can.

We are in business to make profit, and there is nothing wrong with that. It has been my experience that a man's judgment is about as good as the information he has before him when making a decision. Our budget and operating statement, with its emphasis on variance and its segregation of costs from the point of view of their effects on profits, has proved its worth to our organization. With it and supporting it we use parallel records: a shovel record; a comparative statement of production for plants and quarries; asphalt plant, lime plant and pulverizing plant records, a crushing plant record; and records of shooting and drilling. With these records, worked out in conjunction with and printed for us

(*Continued on page* 80)

Utah Plant Moved and Enlarged to Meet Increasing Demand

By H. K. HERRICK

A general view of the Utah Sand & Gravel Products Company's plant at Rockland, Nev.

DURING the season of 1946 the Utah Sand & Gravel Products Co. of Salt Lake City dismantled, moved and rebuilt their Sand Pass, Nevada, ballast plant. The new location is on the Western Pacific Railroad, about 200 miles west of Salt Lake City in the desert of Nevada appropriately named Rockland. The old plant had been very satisfactory but an increase in capacity was required, so many major changes were made—New structures had to be designed and additional machinery procured.

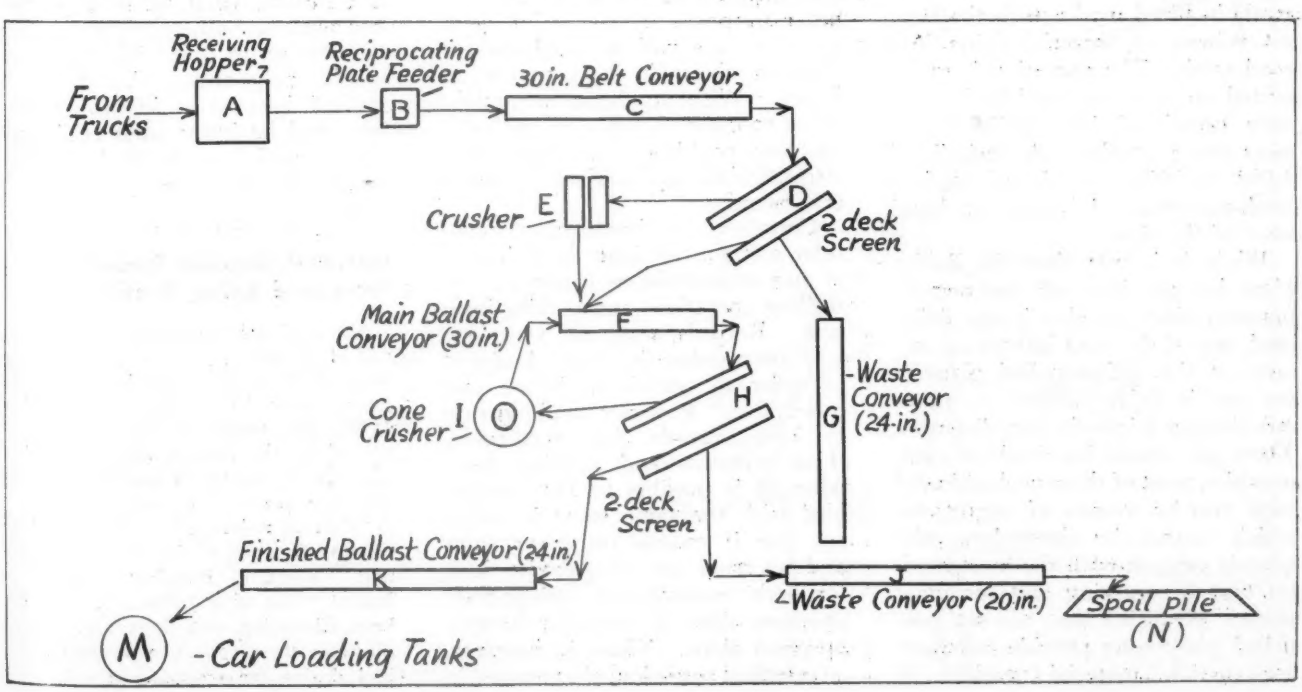
The material from the pit is approximately 50 percent minus ¾-in. and the largest rocks about 9-in. to 10-in. diameter. The sand is somewhat damp, but contains little clay. The pit run material is loaded into trucks by a 2½ cu-yd. power shovel and is hauled to the receiving hopper (A). The top of this hopper is on the level of the pit floor and is protected by a grizzly with about 12-in. openings.

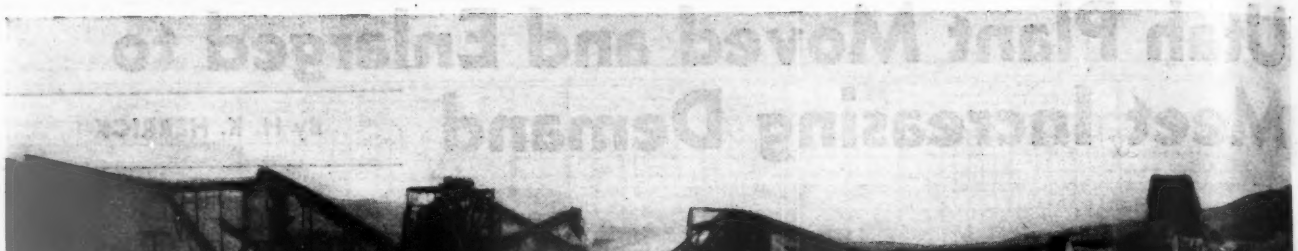
A reciprocating plate feeder (B) feeds material to the No. 1, 30-in. belt conveyor (C). All material from conveyor No. 1 is discharged directly to a Stephens-Adamson 4- by 9-ft. double-deck vibrating screen (D). The oversize of the top deck goes to the primary jaw crusher (E) while the product retained on the second deck goes to conveyor No. 2 (F), and the minus ¾-in. waste to 24-in. conveyor No. 8 (G). The crusher product is discharged directly on conveyor No. 2, and the main ballast material is conveyed to a 6- by 12-ft. Tyler-Tyrock double-deck finishing screen (H).

The oversize from the top deck of this screen goes into a chute and down to a 4-ft. Symons short-head cone crusher (I). The product retained on the second deck of the screen (H) is finished ballast and goes by chute to the 24-in. belt conveyor (K); this transports it to loading tanks (M) where it is loaded into gondola cars.

The product through the second deck of screen (H) is chuted to a 20-in. belt conveyor No. 5 and goes to the spoil pile (N). Conveyor No. 8 (G) also discharges onto conveyor

The flow sheet of the new plant.





• Another view of the plant, approaching from the other side.

No. 5. All this materal is wasted. The limiting factor of plant capacity is the finishing screen but, in general, the plant balance is good.

The power for the plant is supplied by two No. 13000 Caterpillar diesel engines. The cone crusher has an individual No. 17000 Caterpillar diesel engine.

The dismantling, moving and erection at the new site was done in record time under the present extenuating conditions by the Utah Sand & Gravel Products Co. All equipment and structural steel except crushers, diesel engines and finishing screens were furnished by Stephens-Adamson Mfg. Co., of Los Angeles, who also designed and produced equipment for the rebuilding of the plant.

Eric Ryberg, president, and Ezra C. Knowlton, executive vice-president of Utah Sand & Gravel Products Co., were responsible for the successful supervision and production of ballast for the season, starting in May and ending in October.

"Circuit Rider" Plant

(*From page* 75)

terial requires less than an average amount of crushing. The plant can be arranged to produce up to three sizes of material by attaching short lateral conveyors to the sides. When it is necessary to remove sand, a third deck can be installed in the screen.

Mr. Bahler's average annual production of around 78,000 cu. yds. is handled with a two-man crew—a shovel operator and one man to watch the plant. All deliveries are made in hired trucks, with the largest volume of material going into road work. The operation is maintained on a year-around basis, with only occasional idle spells in the most severe weather. A stockpile of 4,000 to 5000 cu. yds. of crushed bank-run material is kept on hand most of the time.

While it is true that the Bahler plant has not been off the owner's property since the day it was delivered, one of the most interesting features of the self-propelled plant as we see it is its ability to move quickly over relatively long distances. There are untold hundreds of communities, most of them well-endowed with near-by sources of aggregates, which cannot by themselves adequately support even the most modest type of crushing and screening plant. We think that the self-propelled plant may provide adequate construction material services to such communities at low cost in much the same fashion that circuit riders formerly supplied legal services. In fact, we think that such plants could very well and appropriately be called Circuit Riders, and we herewith offer the name gratis to anyone who may be interested.

How We Organized

(*From page* 78)

by Remington Rand Inc., and our general accounting records and other accounting data forms for tax and other purposes, it is easy for us to trace down a variance and make a decision about it in a matter of hours. Without them, we might never spot the variance recognizably and we could not, without great effort, isolate and analyze its causes and meaning.

Certainly we should never consider going away from the principle of management-by-exception in controlling operations and making budgets. Records must be kept one way or another in every business, in order to comply with tax and other laws. It is our thinking that to keep records that accomplish these purposes and nothing more when it is possible to kill another bird with the same stone is wasteful, for it entails no more work and no more cost to organize facts for both management and historic purposes than its does for historic purposes alone. There is, however, a practical question that arose in our minds, one that I am certain occurs to many others who feel that there must be a better record system than that which they are using. It amounts to this: Agreed that we could profit from better records at reasonable cost, how are we—practical quarry men with many immediate and pressing problems, and no extensive training in record organization—to get the help we need to devise special records and systems that fit our own business? The answer we found was to call in a Remington Rand Systems technician and outline what we had to have and what our objectives were. The rest was up to him. That may not be the only answer, but for us it worked, because we knew our problems and he knew what equipment existed and how to fit it together to get the results we specified.

National Gypsum Reports Increased Sales, Profits

The National Gypsum Company at the end of the first quarter of 1947 reported sales of $11,619,895, an increase of 54 percent over the corresponding period in 1946. Net profits of $1,314,617 were quoted for the January-March period of this year, as compared with $673,960 for the same quarter last year.

"Current orders reflect continued high demand for each of the company's products," declared President Melvin H. Baker. "Cost of materials and labor has been advancing, but there are now indications these costs may become stabilized during the second quarter."

Cities Plan Big Highway Public Works Programs for 1947 Construction Season

MANY cities are planning extensive public works and pavement construction and paving repairs. However, most cities are hesitant to make definite commitments due to the shortage of labor and materials, such as cement, reinforcing steel and cast iron water pipe (which must be laid before the paving is put down). As a result many of them did not answer a questionnaire sent out by PIT AND QUARRY in an effort to determine the progress of their construction programs. The results which follow do, however, indicate that the municipal construction program for the season now under way is one of the biggest in history.

LOS ANGELES

The City of Los Angeles is actively pursuing a long-range plan for 613.3 miles of parkway to be constructed within the metropolitan area, at an estimated cost of $939,599,000. This grid of limited-access, high-speed parkways will be superimposed on the network of existing streets, and will avoid grade crossings by passing over or under the present facilities. Twenty-three miles of parkway have already been completed, and two miles are now under construction. The city plans to build an additional 6.63 miles in 1947, and in 1948 11.00 miles will be added. The expenditure for 1947 construction is estimated at $9,000,000, and at $10,000,000 for 1948. These estimated expenditures are on the basis of present financing. It is anticipated that additional funds will be made available by the State Legislature on a statewide highway program. Expenditures for parkways in the Los Angeles area are expected to increase rapidly after 1948, and as much as $300,000,000 may be spent in the next ten years.

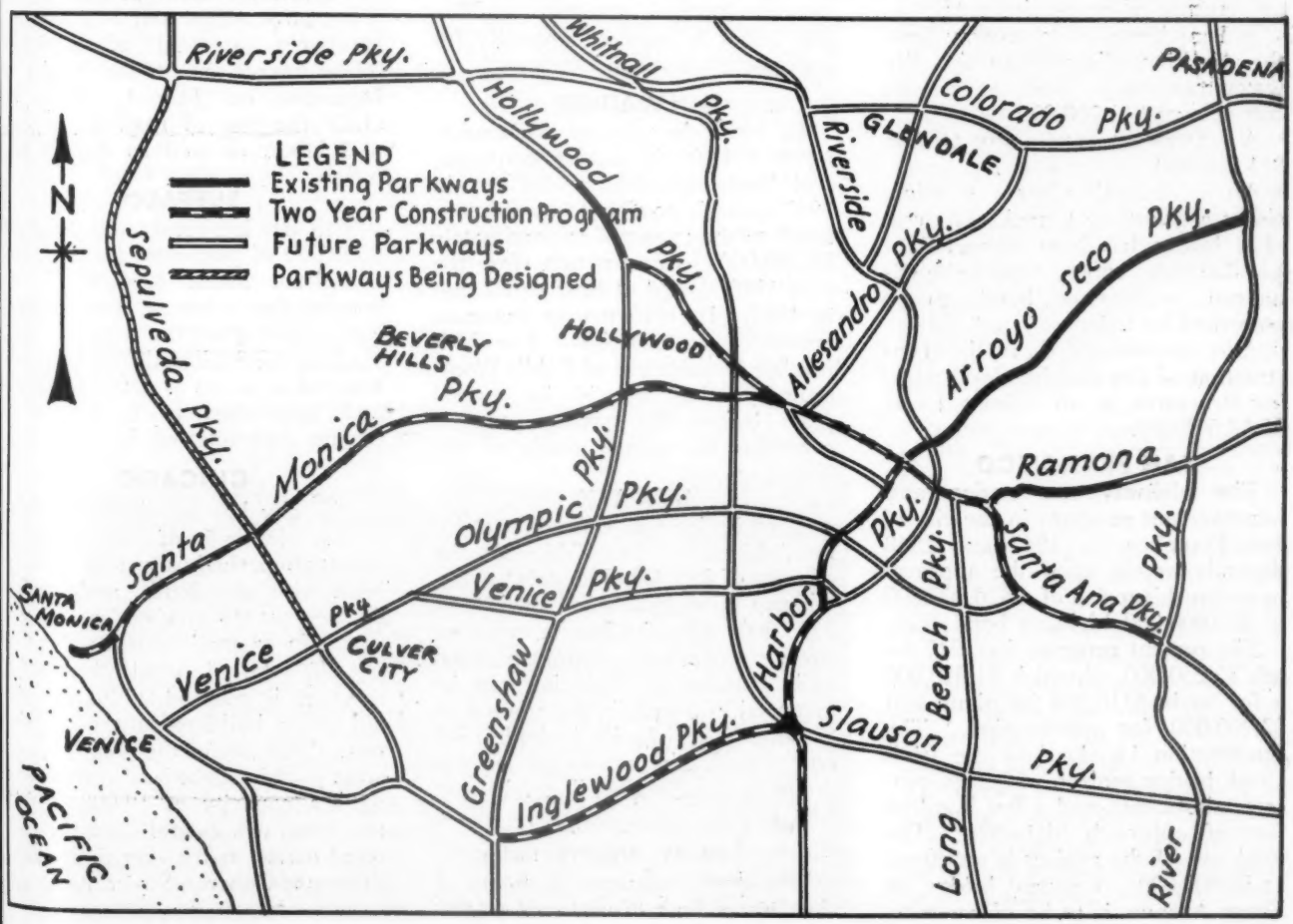
During this time Los Angeles will also carry on its normal improvement program, with an annual expenditure of more than $5,000,000.

Existing parkways in the Los Angeles area are shown in the accompanying map. The Arroyo Seco Parkway connects Pasadena and downtown Los Angeles. Sections of the Ramona and Hollywood parkways are also already in service.

All existing systems are scheduled to be joined under the two-year construction program now in progress. This parkway system, when completed, will link North Hollywood, Santa Monica, Inglewood, Pasadena, the downtown area of Los Angeles, and the smaller eastern suburbs, and will be an excellent start on the proposed parkway grid.

NEW YORK CITY

A $22,300,000 lower Manhattan crosstown expressway would be constructed in 1948 and 1949 under preliminary plans submitted to Mayor O'Dwyer by the city park commissioner, the city construction commissioner, and the Manhattan Borough president. The new project would carry six lanes of mixed pas-



• Los Angeles parkway system.

senger and truck traffic on an elevated structure linking the city's West Side highway with the Holland Tunnel and the Williamsburg and Manhattan bridges. The expressway would be the first of a series of east and west crossings to connect with the new marginal north and south drives, parkways and under-river traffic tunnels.

In connection with the project, a large parking garage for passenger cars and trucks is to be built near the intersection of the main expressway with the Manhattan bridge spur. Parking space will also be provided under the elevated structure at various points along the route.

The Port of New York Authority has reportedly been giving consideration to plans for the future construction of a new tunnel, possibly between 14th Street and Hoboken, to handle rapidly increasing vehicular traffic. Plans to build two more traffic lanes across the George Washington bridge are also being studied by the Authority.

NEW ORLEANS

Needed improvements in the arterial highway system of New Orleans, La., will cost over $50,000,000, according to a recent report given to the Louisiana department of highways. Some of the improvements recommended are:

A Pontchartrain expressway from the Air-Line Highway to the city waterfront, to be built at a total cost of over $11,700,000.

A waterfront expressway to cost $11,200,000.

An additional river crossing, either a bridge or tunnel. The cost of a bridge has been estimated at $22,250,000, which would be financed by revenue bonds to be amortized by tolls.

Also recommended is the construction of five multiple-level parking structures, at an estimated cost of $3,500,000.

SAN FRANCISCO

The highway construction and improvement program in the city of San Francisco for 1947 and 1948 depends largely upon the approval by voters this spring of a $20,000,000 to $30,000,000 highway bond issue.

The present program for 1947 totals $5,250,000, of which $1,940,000 is for lands, $110,000 for plans, and $3,200,000 for construction. The construction includes the Islais Creek bridge project, with new concrete abutments, and a few hundred feet of approach highways. The total cost of the project is estimated at $1,000,000. A second bridge, at Evans Avenue, is to be of concrete, and will cost approximately $80,000. Other classes of construction in the 1947 program are: street improvements, $600,000; widening and channelizing existing street pavements, $600,000; signs and signals, $450,000; miscellaneous, $450,000. This last includes $70,000 for slope protection and drain tunnels, and $380,000 for new concrete sheds and buildings for a corporation yard to replace one that is to be moved for a highway.

The 1948 program is in the amount of $6,650,000, of which $4,300,000 is for construction. Expenditures for 1945 and 1946 were not significant, being from $250,000 to $500,000 annually, an amount which did not meet actual needs.

CINCINNATI

The tentative construction program of the city of Cincinnati involves an expenditure of $11,679,000. However, the highways and sewers committee will probably cut the program to approximately $6,000,000. The tentative program includes street and highway construction in the amount of $1,700,000, $540,000 in grade eliminations, and $2,907,000 for structures. Approximately $750,000 will be spent in 1946 by the city, as compared to $605,000 spent in 1945. These amounts are both considerably below the normal amount ($4,000,000), that is required annually for construction work in Cincinnati.

MILWAUKEE

In 1946 the city of Milwaukee let $1,054,000 in paving contracts, and funds available to the city in 1947 make it possible to award contracts to the extent of approximately $2,500,000. Construction for the year 1948 should at least equal that in 1947. In 1945 paving contracts amounted to $304,000. The Milwaukee Department of Public Works estimates that it will be several years before the paving program overtakes the actual needs of the city.

NEWARK

The city let only one contract for new highways in 1946, in the amount of $20,000. The street maintenance program for 1946 cost $275,000. The city has an extensive street construction program planned and, if necessary financing can be arranged, contracts in the amount of $1,000,000 will be let in both 1947 and 1948. The maintenance programs in these years will total about $200,000 annually.

FORT WORTH

The street maintenance forces of the city of Fort Worth used 43,090 cu.-yds. of sand and gravel, costing $67,025, in the year 1946. 851 tons of crushed stone and 890 tons of rock asphalt were also used, at a cost of $3,160. The total cost of materials used in the year was $84,485.

The Director of Public Works anticipates a 20 percent increase in this expenditure in 1947.

The city will receive bids in January, 1947, for grading and a 1,000-foot extension of a runway at the municipal airport. Contracts for the first two units of expressways are to be let in 1947 by the Texas State Highway Department. The first of these, an East-West Expressway, will have its terminal points at El Paso and Texarkana. The cost of the segment through Fort Worth is estimated at $10,000,000. The other, a North-South Expressway, will terminate at Laredo and Danton. The estimated cost of the Fort Worth portion in this case is $5,500,000. Both costs include right-of-way. The construction will be handled by the state highway department, with the city obtaining the right-of-ways.

PORTLAND, ORE.

The city spent $607,000 on street construction and maintenance in 1946, and has plans for a two-year $1,500,000 program. 1947 construction and maintenance projects will cost $250,000 and $450,000, respectively, a total of $700,000. These figures are for the fiscal year beginning on July 1. They include the cost of road oil, asphalt and labor, as well as quarry materials.

BUFFALO

This city has contracted for about $500,000 of pavement in 1946, and completed about $250,000 in reconstruction work on two viaducts eliminating grade crossings. In 1947, viaducts over railroads will be reconstructed at a cost of about $750,000, and approximately $1,000,000 in paving contracts will be advertised.

CHICAGO

The city has acquired the right-of-way for all of the Congress Street Superhighway that will be built with city funds, and roughly 45 percent of the entire right of way. In general, construction will not be started until the housing shortage is relieved, although some old office buildings are now being torn down along the loop right of way. This eight-lane expressway, with a capacity of 12,000 vehicles per hour, will extend from the lakefront drives to the city limits along the line of Congress Street. At the city

(*Continued on page* 88)

Agstone Unit of New South Carolina Concern Producing 10 Carloads Daily

• A general view of the Carolinas Cement & Lime Company's recently-completed agricultural limestone plant at Harleyville, S. C. The raw storage shed is on the left, the 1,200-ton finished product storage tank on the extreme right.

another ON THE SPOT report

THE newly constructed agricultural limestone plant of the Carolinas Cement & Lime Company, Harleyville, South Carolina, has been in production for a number of weeks now, with shipments averaging 10 carloads a day on an 8-hour

By WILLIAM M. AVERY

operating schedule. In addition to agricultural limestone, this plant will ultimately produce other sizes of material for use in the rubber, glass, paper, stock raising and poultry industries. The new company, headed by J. Ross Hanahan, president, plans at some future time to expand its operations to include the manufacture of cement and lime.

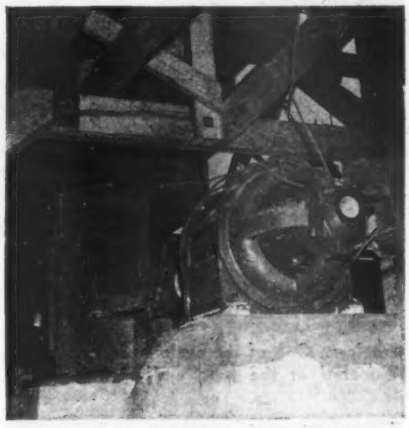
The material processed is the Santee marl, a shell deposit running to depths of 200 feet or more, which derives its name from the Santee River in eastern South Carolina. Between 500 and 600 acres of the 900-acre tract owned by the Carolinas Company are available for raw material, comprising an estimated 55,000,000 tons in the top 60 feet from which recovery will be made. Extensive drilling operations on the property show the composition of the material to be exceptionally uniform, with the average CaC03-content running about 97.5 percent.

The sand-clay overburden ranges from 6 to over 40 feet in thickness, averaging approximately 12 feet over the contemplated working area. A Bucyrus-Erie 38-B dragline with a 1½-cu. yd. bucket has been used to strip some 80,000 cu. yds. of overburden in preparation for mining operations. Most of this material has been used for the construction of levees in the vicinity, but when operations have progressed sufficiently the intention is to backfill overburden into the pit.

At present an 80- by 80-ft. hole is being opened up to a depth of 60 ft. with a dipper stick mounted on the Bucyrus-Erie shovel. Although material recovered in this manner has been used to feed the plant, the primary purpose is to open the pit for an Eagle Iron Works shale planer with which all subsequent recovery operations will be carried on. The shale planer, operating on a rail-mounted bed, will cut a 60-ft. face swinging through an arc of 180 deg. The largest particle delivered by this machine is expected to be 1½ in.

The planer will feed and load the material onto a 24-in. belt conveyor connecting the pit with a

• A view of the marl deposit before recovery operations had commenced. The raw material is being conveyed to the raw storage shed by means of belt conveyors.



• Oversize material is reduced to agstone by this 100-t.p.h. reversible hammermill, which is arranged in closed circuit with a battery of two single-deck screens.

1,200-ton raw storage building, some 500 ft. distant during the early months of operation. Raw material is distributed throughout the 65-ft. length of the storage building by means of a belt tripper, and refed with a drag scraper to another 24-in. belt conveyer set on an incline. The latter discharges directly into the feed end of an 8- by 90-ft. single-shell, coal-fired rotary drier in which the moisture content of the stone is reduced from a probable maximum of about 16 percent to 3 or 6 percent. Considerable additional breaking down of the material also takes place in the drier, which is equipped with lifters to within 10 ft. of the discharge end.

The dried product is elevated and discharged on two single-deck 8- by 10-ft. Tyler Hummer vibrating screens which make a 10-mesh separation, the fines going directly into the finished product bin for agricultural limestone. The oversize fraction at present is all going to a 100-t.p.h. Pennsylvania reversible hammermill, arranged in closed circuit with the screens to reduce the entire flow to agstone. A second battery of single-deck screens (two 4- by 7-ft. Tyler Hummers) is available for making a ¼-in. separation of the oversize from the primary screens. It is planned to market the minus ¼-in. stone as poultry grit, while the final oversize will be sold as aggregate for concrete block production. Conveyors throughout the plant are 24 in. wide and all were supplied by Robins Conveyors Incorporated.

Finished agricultural limestone is elevated to a 1,200-ton storage tank from which gondolas, box cars or trucks may be loaded by means of shuttle conveyors. A packer bin has been located under the storage tank in anticipation of bagging a part of the output at some future time. The drier is fired with a Riley-Jones stoker, and the generated dust is recovered by means of Northern Blower cyclones at the feed end. A Pangborn dust collector is being installed for the recovery of extreme fines (down to micron size) from screens, hammermills and elevators.

Although the rated capacity of the plant is 50 t.p.h., the company expects appreciably higher output during dry weather operations. Specific provisions have been incorporated in the design and layout of

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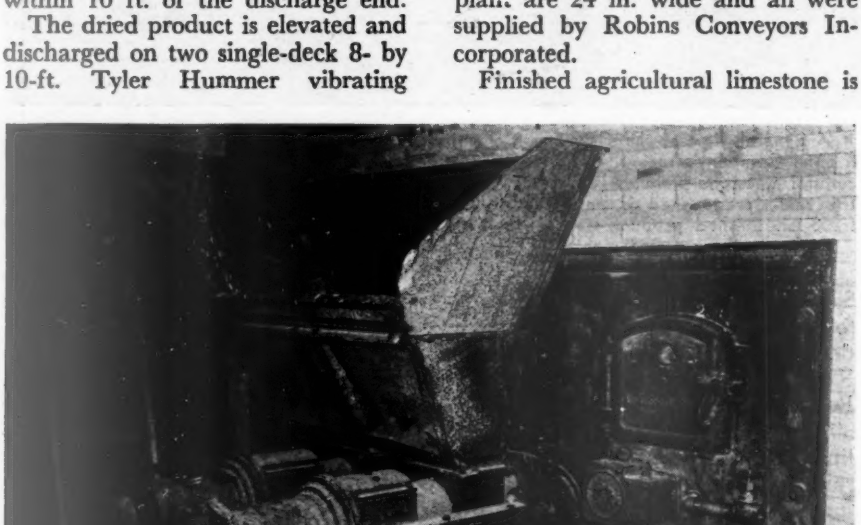
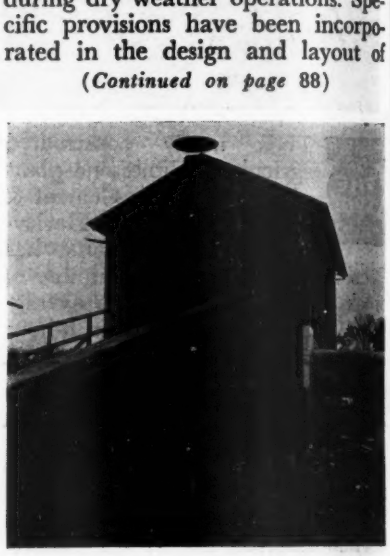


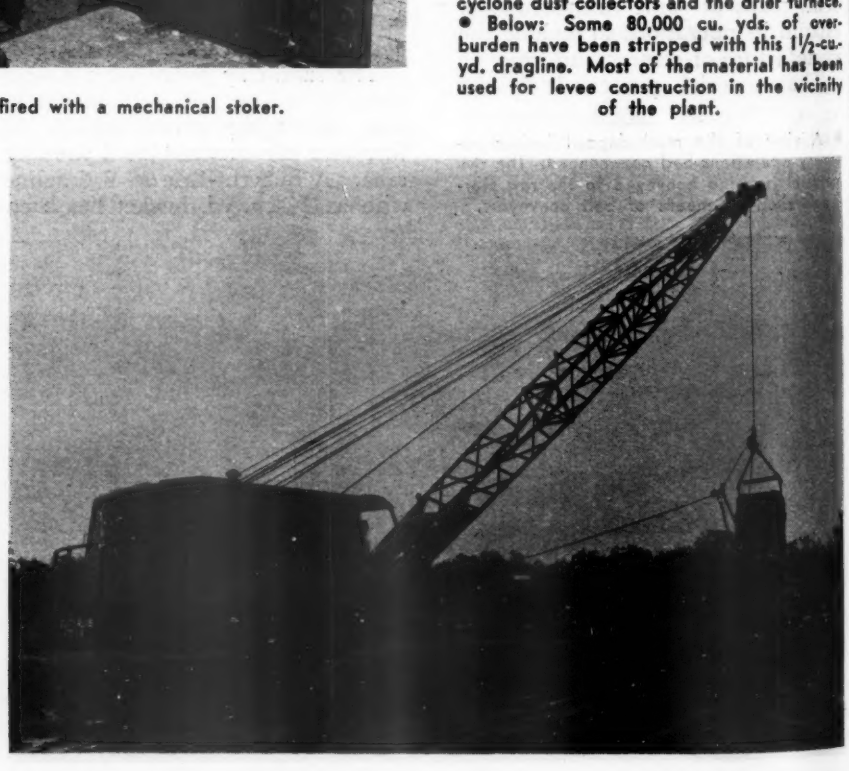
• The 8- by 90-ft. rotary drier is fired with a mechanical stoker.



• The 24-in. belt conveyor which connects the raw storage shed with the feed end of the rotary drier. The building houses two cyclone dust collectors and the drier furnace.

• Below: Some 80,000 cu. yds. of overburden have been stripped with this 1½-cu-yd. dragline. Most of the material has been used for levee construction in the vicinity of the plant.

• Below: One of the cyclone dust collectors located at the feed end of the drier.



THE LIME PLANT OPERATOR

By WOLF G. BAUER
Consulting Engineer

HYDRATION IN THEORY AND PRACTICE

Part VII—Hydrate Processing and Milling

THE product of the industrial hydrating machine is generally anything but a distinct and uniform chemical compound or material. Calcium hydroxide may constitute three-fourths or more of the powder, the remainder being composed of free water or moisture, free or uncombined calcia and magnesia, oxide impurities uncombined or combined with calcium, magnesium and calcium carbonate residual from underburning or from later recarbonation, and partially clinkered lime inert to water. Some of these accessory compounds and impurities may, because of certain chemical and physical properties, be separated from the lime hydroxides. The hydrate processing phase concerns itself, therefore, with the task of purifying and sizing the hydrator product to an acceptable standard. The following points are considered (when the usual hydrators are used):

1. Drying and cooling the hydrator product when aging is not necessary.
2. Aging the product with excess moisture in the form of residual water, or steam and vapor, in order to lower the free lime content.
3. Disintegrating agglomerated and adhering particles in clusters by mechanical means.
4. Separating the required sizes of particles with air currents, or a combination of air and mechanical means, and collecting the sized products as finished material, refuse, or for further treatment.

Composition of Hydrates Hicalcium hydrated lime is, of course, chiefly calcium hydroxide or $Ca(OH)_2$, having a molecular weight of 74.1. It is composed of 75.7 percent calcium oxide or CaO, and 24.3 percent water or H_2O. This would mean that by hydration, the weight of the original lime is increased from 1 to 1.32. In round numbers we can therefore remember that hydrated lime is three-quarters lime.

A dolomitic hydrate from a standard atmospheric-pressure hydrator is mostly a mixture of calcium hydroxide and magnesium oxide. The oxide ratios in dolomitic lime are 58.1 percent CaO and 41.9 percent MgO. Atmospheric pressure hydration will result in 14.1 percent water combining with the 58.1 percent lime, and the resulting hydrator product would then analyze 62.6 percent calcium hydroxide and 37.4 percent magnesium oxide. In practice 5 percent more or less of the magnesium oxide is converted, however. During subsequent pressure hydration, all of the remaining magnesia may be hydrated, and the pressure hydrator product would theoretically show an analysis of 54.5 percent $Ca(OH)_2$ and 45.5 percent $Mg(OH)_2$.

Wolf G. Bauer

Drying In a stage-process controlled hydrator, drying and cooling is an integral stage. In ordinary machines, drying can be done ahead of air-separation. However, when free lime is a problem, as it frequently is with certain machines and limes, sufficient residual moisture is retained in the hydrator product to allow the vapor to be absorbed in the after-hydration or aging process. In that case, drying will have to be done with extra heat from other sources if efficient classification is to be had. After-hydration in silos has some drying effect on the hydrate mass.

It should be kept in mind also, that some carbon dioxide may be picked up if drying has to be done with cold air alone, as by passage through disintegrators and classifiers in closed circuit to which extra air is added to decrease the humidity. Drying is therefore best accomplished by employing some of the residual heat from the hydration reaction. If this cannot be done, the air quantities in contact with the hydrate must be held to a minimum by using pre-heated air.

Aging In certain foreign countries, after-hydration constitutes a very definite phase of hydration, inasmuch as complete initial hydration in the mechanical mixer is not obtained or attempted. However, this sort of bin-hydration should not be confused with bin-aging of a practically completely hydrated lime. In the former case enough moisture and potential heat generation remain in the hydrator product to hold the partially hydrated lime mass in the bin or silo at a sufficiently elevated temperature and vapor pressure to cause hydration to proceed at an optimum rate throughout the mass. Such bins have special design features incorporated to facilitate this process. Although moisture and heat distribution may not be entirely under control, yet in effect, such a system is really the low-pressure steam-curing stage of our previously discussed stage-controlled continuous hydrator, where the initial high-reaction temperature is inhibited in the mixer ahead of the bins.

On the other hand, when a poorly-designed or operated hydrator discharges a product containing free lime, as determined by analyses or steam tests, bin aging is often resorted to. This is an expensive expediency, and does not lend itself to control. Of course, if it is a matter of providing for bin aging or not at all, then by all means, the shortcomings of the hydrator can be partially corrected through after-hydration means in silos. As usually practiced, much of the moisture is retained by the fine hydrate which does not require it, heat is lost in the process of transferring the material to the aging bin, insufficient heat is generated to promote reaction of the slow-hydrating lime, and water vapor has difficulty in permeating to the low vapor pressure areas in which the reactions take place, i.e., where hydration reduces the water content of the air. Furthermore, it is exceedingly difficult to judge the amount of moisture that can be allowed to

pass into the aging bin. Any excess will bring on bin discharging difficulties, as well as inefficient milling and classifying.

Operators troubled with incomplete hydration and free lime in their hydrate have a choice of several avenues of approach to the problem, and a little investigating will determine how to improve the situation with the least expenditure. If it is the fault of the hydrator, design and operational changes may be made along the points brought out in previous discussions on that phase of hydration. If the problem is serious, it may warrant making some drastic changes in the burning department in order to obtain a more uniform and reactive lime. Sorting of lime into hard- and soft-burned fractions is not a cure, but may have to be resorted to as a temporary expedient.

Screening tests of the hydrator discharge product may determine below what sizes of particles the greatest percentage of free lime remains. By first removing this size in the classifier integral with the hydrator, the troublesome fraction can be subjected to further special hydration, and the whole of the original lime turned into stable hydrate.

Some operators make a preliminary separation of the hydrator product by passing the material over an impact screen to remove very coarse impurities such as overburned lime and core. However, such screens must have relatively large openings, and are of some help only if the hydrator feed size is exceptionally coarse. Others pass the hydrator product through a mechanical air separator. The coarse fraction of the separator is then passed to a disintegrator or beater mill, or chuted to a so-called aging bin. In other instances, the coarse rejects from such a separator are returned to the hydrator feed.

Returning separator rejects to the hydrator is equivalent to closed-circuit grinding. The hydrator throughput is increased considerably, but the output increase is questionable. There is also considerable operating interference and rapid overloading and flooding of hydrator and conveyors. The circulating load may quickly build up to a point where shut-down of the hydrator becomes periodically necessary to clear the system.

Dual Hydration The idea of dual hydration may not be new, (it is used in pressure after-hydration of dolomitic limes) but its significance may have escaped us in considering continuous stage processing. In the early days of ore and materials crushing and grinding, 'single-pass' reduction was accepted practice. But seldom do we now clutter up a reduction unit with sizes below the effective crushing ratio, i.e., the fine material is screened out ahead of a crusher by screen or grizzly in order to increase crusher efficiency and capacity.

Under certain burning practices it is practically impossible to feed the hydrator with particles of quicklime which all have identical hydration rates. Arbitrarily, then, such lime may be divided into a quick-hydrating and slow reacting portion. In the stage-processing continuous hydrator, the low-pressure steam-curing chamber takes care of this slower reacting portion, but without separating it from the fraction already converted to hydroxide in the peak-reaction chamber. If this hydrate powder were separated out ahead of the steam hydration section, the effect would be quite similar to that achieved when fines are screened out ahead of a crushing or grinding unit, namely, the secondary hydration section would be able to handle more lime and the total output would be increased.

In some dolomitic lime hydration plants, the lime is first hydrated under atmospheric pressure to hydrate the hicalcium portion, and then subjected to steam pressure in a separate hydrator to hydrate the magnesium oxide. Of course, the magnesium portion could also be hydrated in the first unit, but the output would be so reduced by the time factor that the process would become uneconomical. There are many hydrators in use today which are held back in output rate by the simple fact that over two-thirds of the retention time in the hydrator is taken up with hydrating about 10 percent of this slower reacting portion. In plants where output is a vital factor, and mixed limes must be hydrated together, separation of these fast- and slow-hydrating lime portions after rapid initial prehydration should be considered.

In designing and working out this technique and equipment, therefore, the pre-hydration and peak-hydration period must be fitted to the peak-hydration chamber, and the separation made at such a time that at least 20 percent of the total lime makes up that portion which is further treated under favorable steam and temperature conditions. This minimum quantity should be assured in order to have enough of fairly reactive lime present for heat generation. Whether this secondary hydration chamber for the slow reacting fraction is a specially designed hydration bin with vapor vents and moisture control, or whether it is a large container insulated and provided with slow-moving agitators and sealed for some steam pressure, the point is plain—the first of primary hydrator acts as a scalping screen for the secondary unit.

Milling The accepted standard for milling is the Raymond Imp or beater mill. This mill is in effect a slow-speed air-swept hammermill in which an integral centrifugal and adjustable classifier returns the oversize to the milling chamber. The fines are caught up by the induced air stream from an external fan and deposited in a cyclone collector. The classifier is either a louvre-adjusted static type, or one in which horizontally positioned fan blades or rods create the centrifugal classifying action, which is adjustable through variable speed regulation. The speed of the mill (hence the impact and attrition force) is held below a certain predetermined value in order to prevent pulverization of impurities and unreacted lime, this latter material being ejected automatically because of its size and density. It would be of considerable advantage to use a variable speed mill motor drive in order to regulate the milling to the degree of attrition that will bring the product within the required and allowable analysis for impurities such as free lime and carbonate. The amount of grinding that can be allowed will vary considerably with different consumers and limes, and the regulation on the will will be dictated by results of screen and chemical analysis of the mill rejects.

The use of a mechanical air separator ahead of the beater mill is often resorted to in order to increase the capacity for attrition on the coarser particles in the mill. By skimming off about 40 to 50 percent of the fines from the hydrator product, or from aging or storage bin, such as separator may double the processing capacity of the mill.

Since the output of the hydrator will vary acording to changes in lime and hydrate specifications, a surge bin must be provided between hydrate discharge and mill, or between the pre-classifying air separator and the mill. Because of moisture conditions, lack of control, and little available reaction heat, depending for final hydration on such bins is not the best practice. Aging

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should really be replaced by secondary hydration under the optimum conditions, as pointed out, and this cannot be done very well in the ordinary type of bins. Hydrate processing and milling becomes a lesser problem when efficient hydration is provided for.

Classification Hydrated lime introduced to air separators must be "dry." However, dryness in this case is only relative. The mixture of hydrate particles and air and vapor or steam contains water in gas form, but if the temperature of this mixture is high enough, the particles can be suspended in the air or vapor as though they were dry, i.e., they will not cluster together but act as any dusty, dry material. For this reason, considerable moisture or water in steam or vapor form may be carried into the classifying system as long as the separator parts in contact with the hydrate are held above a certain temperature. If, however, no moisture can be allowed in the hydrate, then drying must be done ahead of classification.

Depending on the humidity of the outside or carrying air, a certain amount of hygroscopic water is held by the powder, and can only be released by raising the temperature of air and lime. Due to the pulverent and aeriated condition of the hydrate powder leaving the hydrator, the void spaces between the particles may be occupied by vapor-carrying air that quickly becomes saturated when the material is cooled after leaving the hydrator. Hence it should be no surprise to observe an apparently dry hydrate at the point of discharge from the hot hydrator becoming agglomerated and slightly lumpy and adhering at the point of entry to the classifier, especially if the conveyor and transportation time is extensive. Such hydrate will tend to adhere to the classifier walls, blades, louvres, etc., and affect its operating efficiency very markedly. Fine particles in such hydrate will tend to cluster and agglomerate to such an extent that a large percentage of the already finely divided and finished product is thrown out of the collecting currents into the coarse reject fraction, causing heavy loading and reduced capacity in the mills. It is truly amazing how many plants labor under this so obvious condition.

There are two ways to overcome this: either the hydrator product is cooled and dried prior to classification, or the classification is carried on above dewpoint temperature. Despite the fact that anyone can demonstrate this lumping phenomenon to himself by blowing hot hydrated lime into air which is cooler, operators continue to allow steam-aerated hydrate to cool and condense its moisture in the classifying process, and so impair the efficiency and capacity of the plant.

Development Factors Present-day hydration and calcination are uncontrolled and inefficient. To face this fact and realize it in the light of progress in other chemical process industries, is to have taken the first step toward doing something about it. Those of us who do recognize the shortcomings, however, have been working on the problems, and it is hoped that more than just pilot plant results can be placed before the industry, in the not too distant future.

It is an engineer's duty to eternally ask "Why?". It becomes his second nature to question the obvious and the established. Technologists working on problems of lime hydration with operators in the field have made improvements right along; and so the criticisms leveled at so-called modern hydration practices in the past series of articles has been an attempt to arouse the interested operator to do some original thinking along fundamental lines. If the material presented by the writer has favored "know-how" over "show-how," such a policy has been necessary for professional and ethical reasons.

Primary engineering borders on invention and originality. Secondary engineering, no less important, adapts primary engineering to the accomplishment of the tasks. Research enters into both.

Hydration is an engineering problem. It is also a problem of chemistry and economics. When the chemist determines and then defines the optimum conditions under which a lime should be burned and hydrated; when the engineer designs and builds the equipment to establish and control such conditions; and when the economist approves the cost of production under the imposed circumstances—then we may feel that further improvement is only a matter of degree.

Cities Plan Programs

(*From page* 82)

limits, the county and state plan to take over construction, and connect the expressway with the state and Federal interregional highway system. Cook County is purchasing its own right of way, while the city is purchasing for the state.

The highway will pass through the La Salle Street railroad station, (which must be relocated), and will be elevated along part of its length, starting at Wells Street and crossing the Chicago River to pass through the new Post Office building. An arcade was built through the center of the new Post Office for this purpose. The highway will return to grade at Desplaines Street. From near Halsted Street to Austin Boulevard, the highway will be depressed 6 to 14-feet below existing street grade. The side slopes of the depressed section will be landscaped.

For part of the length of the highway, the west-side subway will run down the center of the cut, dividing the two four-lane strips.

The city of Chicago is also constructing a subway system, which will serve the northwest section of the city in particular. Approximately 80 percent of this subway route had been completed when construction was halted in 1942 by government order. The balance of the work can be completed, and the route placed in service, within approximately two years. The city council has approved a contract negotiated with the S. A. Healy Co., Chicago, and Peter Kiewit and Sons Co., of Omaha. This contract calls for completion of the work by the two companies as a joint venture. The contractors are now setting up their plant, and actual construction should begin in June, 1947.

Agstone Unit

(*From page* 84)

the plant for doubling production, whenever the volume of business justifies such a move.

Rail shipments will account for most of the output, although local users within a radius of 40 or 50 miles will be supplied by truck. For purposes of demonstration only, the company plans to operate one Highway Equipment spreader truck, but there is no present intention to go into the spreading business on any major scale. Similarly plans are under way to secure a car unloader with which to demonstrate the advantages of unloading hopper-bottom cars directly into trucks. Practically all the farm lands in South Carolina and in adjacent states are urgently in need of lime applications, and the company recognizes that it has a larger responsibility than the mere production of the material for this important conser-

vation work. It is hoped that the proposed demonstrations, in combination with an intensive advertising program, will awaken farmers in the area to the importance of soil liming.

Because of its exceptional uniformity the Santee marl is ideally suited to the manufacture of portland cement. Initially the Carolinas company plans to operate a single 330-ft. kiln with a capacity of about 2,200 bbl. per day. Sufficient clay to make up 10 or 15 percent of the total raw material will be shipped to Harleyville from St. Mathew, a 60-mile haul.

Officers of the Carolinas Cement & Lime Co. are J. Ross Hanahan, president, Charles F. Lewis, vice president and manager, Thomas H. Carter, secretary-treasurer, and Girard W. Moore, engineer and plant superintendent.

Two Gypsum Ships Launched For Panama Gypsum Company

Two gypsum carriers, the *Gypsum Queen* and the *Gypsum Prince*, have been launched at the Kearny, N. J., shipyard by the Federal Shipbuilding and Dry Dock Company for the Panama Gypsum Company, Inc., a subsidiary of the United States Gypsum Company. The *Queen*, first to go down the ways, has a deadweight of 10,250 tons and a cargo capacity of 300,000 cubic feet. The vessel has a self-unloading bulk gypsum rock carrier and conveyor belts for moving the rock to the docks. She is 441 feet long, with a 64-foot beam and a draft of 24 feet.

The *Prince* is a single-screw vessel with a deadweight of 10,350 tons and a speed of 12 knots. The length and beam are the same as those of the *Queen*. Mechanical unloading machinery is also a feature of the *Prince*.

Gypsum, Lime & Alabastine, Canada, Ltd., of Paris, Ont., had a net profit of $581,970 in the year ended November 30, 1946, as the result of a record volume of sales. Capital expenditures amounted to $276,602; and refinancing was completed at a saving in interest charges. Orders on hand, it is reported, are greatly in excess of facilities, and the company has inaugurated further expansion.

Operations will soon be resumed at the Limestone Quarry near Limerock, R. I., after a lapse of 33 years. Formerly operated by the Harris Lime Company for the production of building lime, the quarry will now be worked to produce agricultural limestone. A building is now under construction for the crushing operations.

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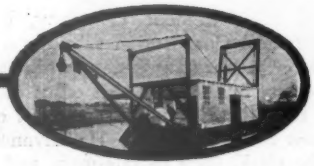

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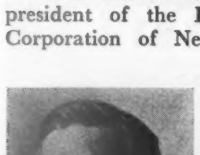
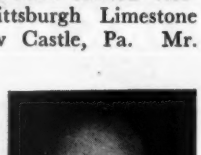
PERSONAL MENTION

R. E. LARRY has been elected vice-president of the Pittsburgh Limestone Corporation of New Castle, Pa. Mr.



R. E. Larry



H. L. Gordon

Larry was assistant to the president before his promotion.

Retiring from the duties Mr. Larry will assume is H. L. GORDON, who has been associated with Pittsburgh Limestone Corporation for the last 28 years. The firm is a subsidiary of the United States Steel Corporation.

THORKILD AVNSOE has been elected executive vice-president of the Lone Star Cement Corporation. Mr. Avnsoe has been with Lone Star interests since 1912 and has been vice-president in charge of operations since 1929.

FLOYD ERICKSON was recently made general sales manager of the Consolidated Rock Products Company of Los Angeles, Calif. At the same time the following additional appointments were announced: CHAUNCE LE VALLEY, assistant general sales manager; BILL KINGSBURY, assistant sales manager of building materials; BYRON WEINTZ, assistant sales manager of ready-mixed concrete; JAY LILLYWHITE and TOM LANE, district managers.

L. R. BURGH was recently named chairman of the board of directors of the Glens Falls Portland Cement Company, Glens Falls, N. Y. Other officers elected are the following: H. E. HARDING, president and manager; S. H. MACARTHUR, vice-president in charge of sales; J. E. SINGLETON, vice-president; R. C. CARTER, secretary-treasurer.

W. O. BOVARD has been made vice-president in charge of sales of the Canada Cement Co., Ltd., Montreal, Canada. He has been general sales manager since 1927.

VICTOR J. AZBE, consulting engineer, announces the removal of the Azbe Corporation headquarters to 8135 Forsythe Blvd., St. Louis, Mo.

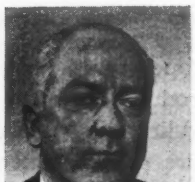
LEE B. GODFREY has been named director of sales of the Signal Mountain Division, General Portland Cement Company, to succeed Irving F. Sisson, who died on April 28. He has been assistant director of sales for the division since May 1, 1945.

Mr. Godfrey has been connected with the cement industry for the last 21 years, having served Signal Mountain in Atlanta before coming to Chattanooga.

ALLEN H. UHLER has been appointed chemist at the Alsen, N. Y., plant of the Lehigh Portland Cement Company, succeeding Alfred W. Schaeffer. First employed in 1939, Mr. Uhler has been at the Alsen plant since 1940 and has been assistant chemist since his return from military service in 1946. During World War II he served as a meteorologist with the rank of first lieutenant.

ALTON J. BLANK, chemical director of Cement Process Corporation at Puebla, state of Puebla, Mexico, was elected Most Worthy Grand Master for 1947-1948 at the 87th Annual Communication of the M. W. York Grand Lodge of Mexico, F. and A. M., held in Pachuca, Hidalgo on April 3.

FRANK J. WHITMAN, assistant sales manager, Chicago territory, has been appointed sales manager, succeeding EDWARD QUEBBEMAN, who has retired after 51 years of continuous service with Uni-



F. J. Whitman

E. Quebbeman

versal Atlas Cement Company, United States Steel Corporation subsidiary.

Mr. Quebbeman began work as an office boy in the St. Louis office of what was then the Cement Department of the Illinois Steel Company. He advanced to junior clerk, then to salesman, and later to division sales manager. Since 1928 he has been sales manager for the territory including Indiana, Michigan, Wisconsin, and Illinois, except metropolitan Chicago. Mr. Quebbeman was active in aiding the growth of the Universal Atlas Company to a point at which it produces in four days more cement than the entire nation produced in 1896, when foreign cement outranked domestic cement.

Frank J. Whitman, who succeeds Mr. Quebbeman, joined the Universal Atlas Company in accounting in 1918. Three years later he transferred to sales work. He has served as field representative and as sales correspondent and since 1938 as assistant sales manager for Wisconsin, Michigan, Indiana and Illinois, except metropolitan Chicago.

A. G. SINCLAIR is the new general manager of the Canadian Products division of Canadian Johns-Manville Co., Ltd., Toronto. Mr. Sinclair, who has been associated with Canadian Johns-Manville since 1935, was formerly special representative of the Winnipeg district sales office. In his new position he will be responsible for the sale of Johns-Manville industrial products and building materials in Canada.

F. A. BROMLEY, who has been with the same firm in the United States and Canada since 1934, has been named merchandise manager of Canadian Johns-Manville. He will now direct merchandising activities for all of the firm's products sold in Canada.

J. M. BREEN was recently appointed assistant general manager of Canada Cement Co., Ltd., with head office in Montreal, Que. He joined the company as technical engineer in 1922, and was appointed chief of technical staff in 1934.

WILLIAM C. MCGOLPIN, president of the National Fireproofing Company of Canada, Ltd., and of the Brick and Tile Manufacturers Association of Canada, was recently elected president of the Canadian Ceramic Society.

PETER COLEFAX, former executive vice-president of the American Potash & Chemical Corporation, was recently elected president of the firm. Mr. Colefax has been with the company since 1935. He succeeds FREDERICK VIERWEG, who resigned after 28 years of service.

H. C. PETERSON of the Freeport Sulphur Company of New Orleans has been named secretary-treasurer of the Delta section of the American Institute of Mining and Metallurgical Engineers. He succeeds W. J. GILLINGHAM.

M. I. SIGNER is the new dean of the Colorado School of Mines. He succeeds COL. JAMES BOYD, who was appointed director of the U. S. Bureau of Mines.

DR. H. L. KEENLEYSIDE was recently named Deputy Minister of Mines for the Dominion of Canada by Prime Minister MacKenzie King. He succeeds DR. CHARLES CAMSELL.

ARTHUR I. DEHUFF, who has been manager of the Metaline Falls, Wash., plant of the Lehigh Portland Cement Company since 1940, retired on May 1. Mr. DeHuff, a graduate mining engineer, was employed in 1909 when the Metaline Falls plant was being built by the Inland Portland Cement Company. He later became successively chemist, chief clerk and chemist, and supervising chemist and engineer.

A. W. SCHAEFFER has been named as plant manager of the Metaline Falls, Wash., plant of the Lehigh Portland Cement Co. effective May 1. Mr. Schaeffer was formerly chemist of the Lehigh plant at Alsen, N. Y., where he has been located since 1940. He is a graduate of Muhlenberg College, Allentown, Pa., and was first employed by Lehigh in 1937.

MELVIN H. BAKER, president of the National Gypsum Company, has joined the committee of 100 national business, civic and industrial leaders, organized by Sponsors of Government Action Against Cancer, to secure public backing of four cancer research bills now before Congress.

The officers of the constituent divisions of the newly-formed General Portland Cement Company (a merger of Florida Portland Cement Co., Signal Mountain Portland Cement Co. and Trinity Portland Cement Co.) were announced as follows:

Vice-presidents, FRANK M. TRAYNOR, Florida Portland Cement Division, L. HARDWICK CALDWELL, Signal Mountain Portland Cement Division, and J. F. HAYDEN, Trinity Portland Cement Division; director of sales, I. F. SISSON, Signal Mountain Portland Cement Division; manager, white cement department, PAUL F. KEATINGE, Trinity Portland Cement Division (Chicago).

OBITUARIES

BENJAMIN P. CLAUSER, 75, retired construction superintendent of the Lehigh Portland Cement Company, died at his home in Schnecksville, Pa., on April 11 after a long illness. He had worked out of the company's Ormrod office as superintendent for 42 years, retiring about eight years ago.

HERBERT CRUSE, 59, of Columbia, Ill., was killed recently in an accident at the Columbia Quarry No. 1, where he was employed as a shovel operator. According to reports, a rock bank caved in and struck the shovel, causing Cruse to suffer a skull fracture.

IRVING F. SISSON, director of sales of the Signal Mountain Division, General Portland Cement Company, died in an Atlanta, Ga., hospital on April 28. Mr. Sisson had been associated with Signal Mountain for the last 19 years.

HERBERT H. HERRINGTON, 67, who had operated a sand and gravel business for 25 years in Oneida Castle, N. Y., died recently.

WILLIAM HUPMAN, 50, purchasing agent for the Southwestern Portland Cement Company, Los Angeles, Calif., died at his home recently after an extended illness.

FRED HATTON, 35, an employee of the Charles Stone Corp., Cypress, Ill., was electrocuted while working in the company quarry. The accident occurred when a crane boom struck a power line, short circuiting the current which ran down the steel boom to a pulverizer on which Mr. Hatton was working. He was killed instantly.

SAMUEL HEWITT, co-owner of the New Empire slate quarry at Slatedale, Pa., was crushed to death on March 29 by a rock fall in the quarry. Death was instantaneous.

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Note in the above photo the water jug resting on the base frame of a Seco vibrating screen moving at 1000 R. P. M. shows no vibration. This means all the vibration is kept in the live body of the screen. Result . . . more tons per hour, less wear and tear on moving parts, and no undue stress on the supporting structure. Put a dependable Seco to work on your screening job! Write for "A Guide to Better Screening." Dept. A.

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New Machinery And Equipment

● Dragline Bucket

Lightness and durability were the prime objectives sought in designing the new Hendrix "Lightweight" dragline buckets, offered by Hendrix Manufacturing Company, Inc., of Mansfield, La. These buckets are made in capacities of ⅜ to 30 cubic yards.

Among the special features to be noted are the following: all-welded construc-

All welded construction.

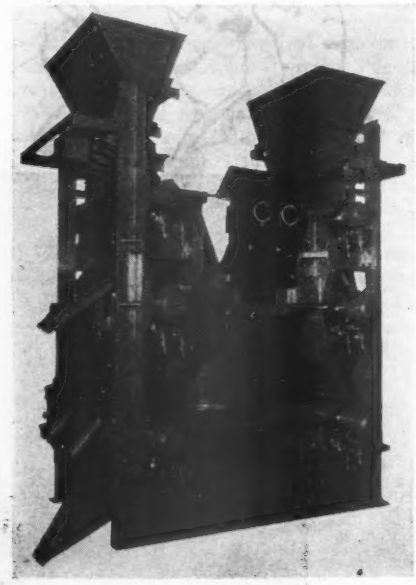
tion; manganese steel chains and fittings; reversible tooth points; three types of construction—light, medium and heavy-duty.

The Lightweight is reportedly 20 percent to 40 percent lighter than similar buckets, type for type. It is designed to carry a full payload every trip, even in wet digging, to perform in perfect balance and to handle easily and rapidly.

For operation in wet ground, the company offers a model with perforated sides which retain the material but allow the water to drain out.

● Magnetic Separator

A high-intensity magnetic separator for the separation of weakly magnetic materials has been manufactured by the Exclon Company, 962 Niagara Street, Tonawanda, N. Y. The model illustrated consists of two gravity feed hoppers and six belt-driven rotors providing four separations on each side. The capacity



Four separations.

is 2 to 4 tons per hour head feed, depending on the material to be separated.

The strength of the magnetic field is increased from rotor to rotor to affect the less and less magnetically susceptible particles until all magnetic material has been removed from the stream. Both constant speed and variable speed drives are now available.

● Shovel Unit

The Osgood Company, Marion, O., has announced its new 1¼-cu.-yd. machine,

One of two new models.

the Type 71. This unit, made in two models, features the Osgood air control and air-cushion clutches.

Model 710, mounted on crawlers, is available as shovel, dragline, clamshell, crane, backhoe, and other combinations, and is readily interchangeable in the field from one class of service to another. Model 715, the "Mobilcrane," is a pneumatic tired, one-engine, one-man-operated materials handler.

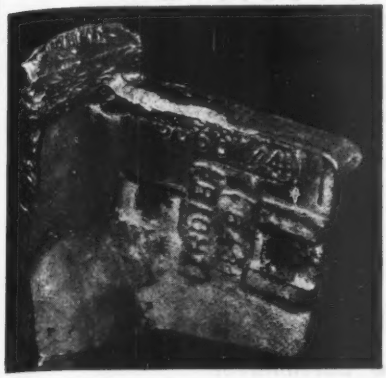
● Level Indicator

A material-level indicator, manufactured by the Fuller Company, Catasaqua, Pa., is used to indicate or control the level of dry pulverized, fine, crushed and granular materials passing into or out of a bin, silo or bunker. It may be used to control or operate such equipment as a feeder, valve, elevator or conveyor by starting or stopping the motor driving the equipment.

It is claimed that the instrument will not be affected by a momentary surge of material into a bin, nor will it give a false indication by the settling of an aerated, pulverized material. The motor in the indicator is reportedly capable of operating 24 hours a day.

Hard-Facing Paste

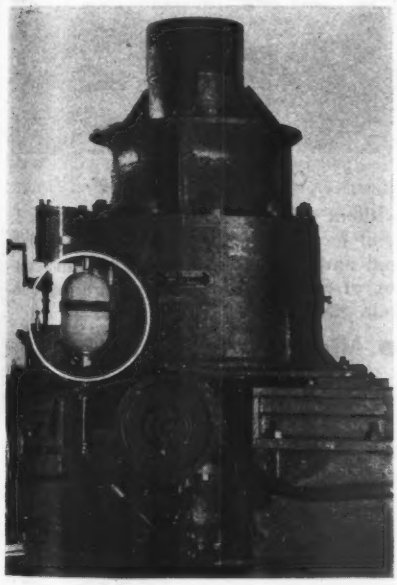
For hard-facing machine and tool parts which receive hard abrasive wear, The Wall Colmonoy Corporation, Detroit 2, Mich., has developed a new sweat-on paste. The paste is applied to



the surface with a spatula. It is allowed to air dry and then is fused into the base metal by a carbon arc. Because of its hardness it is not machinable and is therefore limited to rough applications.

Crusher Reset

An automatic reset, simple in design and easy to install, which operates to discharge unbreakable material from the



Simple automatic device.

Allis-Chalmers Type "R" reduction crusher has been announced by the company.

The new device provides an automatic, positive method of resetting the crusher after the head has lowered and permitted the passage of unbreakable substances. When any such objects enter the crushing chamber, pressure in the hydraulic system is increased sufficiently to compress a gas-filled bag and oil enters the automatic reset's steel shell, permitting the crushing head to lower sufficiently to discharge the unbreakable material.

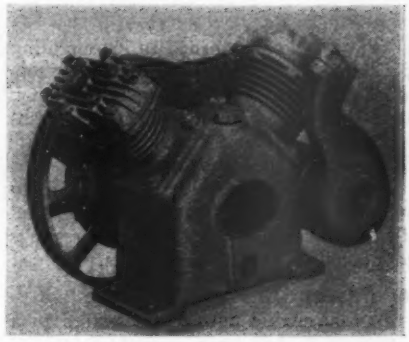
Following discharge of the material, the gas pressure in the bag forces the oil out of the automatic reset and the

(*Continued on page* 94)

Air Compressor

A new line of air compressors has been announced by Worthington Pump and Machinery Corporation, Harrison, N. J. Designated as the "Air King," this line includes single-stage and two-stage sizes for pressures up to 250 p.s.i. for mating to standard motors of 1 to 15 horsepower inclusive. Now available are self-contained, power-driven models mounted on bases or tanks, as well as bare compressors for either direct or V-belt connection to drivers.

In automatic starting of compressors, a centrifugal clutch permits the driving motor to attain full speed before the compressor turns. This eliminates the need for starting unloaders, check valves, re-

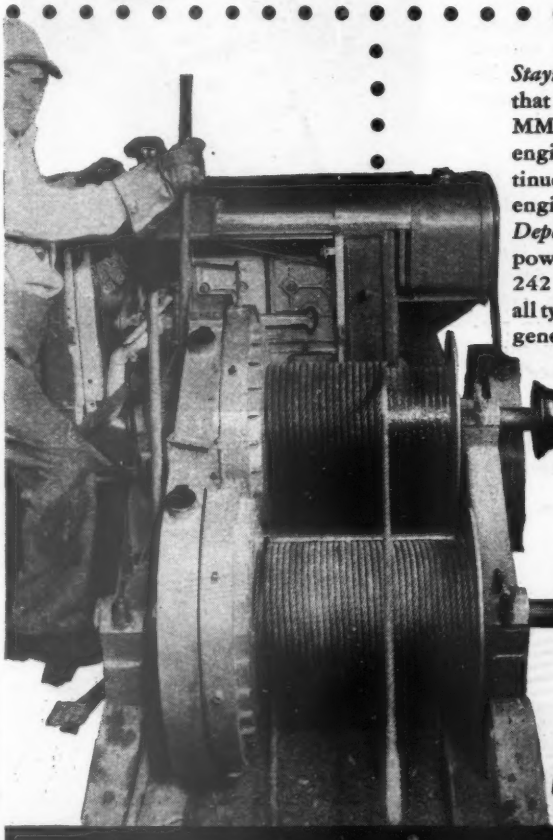


Self-contained model.

lease and bleeder valves. A guard incloses all moving parts.

FIRST FOR

STAYING POWER



Staying Power and *Service* are terms that have long been identified with MM industrial power units and engines . . . For many types of continuous service installations MM engines have achieved records in *Dependability* and *Economy* . . . 7 power units ranging from 20 to 242 h.p. furnish ideal power for all types of crushers, hoists, pumps, generators and many more uses.

MINNEAPOLIS-MOLINE MM MODERN MACHINERY

See Your Nearest M-M Dealer, Distributor or Write

MINNEAPOLIS-MOLINE
POWER IMPLEMENT COMPANY
MINNEAPOLIS 1, MINNESOTA

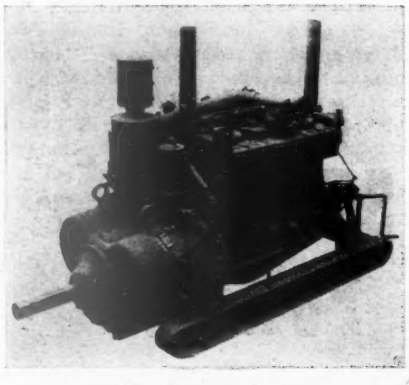
(*Continued from page* 93)

crushing head is returned to its operating position. The unit functions entirely separate from the speed set control, which is used by the operator to adjust the crusher, change product size, or compensate for wear on the crushing surfaces.

Pressure in the reset is adjusted to suit the particular material being handled, and can be operated at pressures to suit all Type "R" conditions.

● Power Unit

A dual engine power unit geared to a single shaft has been manufactured by the Minneapolis-Moline Power Implement Company, Minneapolis 1, Minn. This MM1210-12A model is equipped



Can use natural gas.

with a special water cooled intake manifold so that the engine can use natural gas. Clutch levers may be operated individually when one engine is to be used as a standby under reduced loads.

● Correction

We regret that through an error the illustration of the Lippmann heavy-duty rock feeder shown on page 91 of the April issue of PIT AND QUARRY was incorrectly described. Actually, the description was that of the Lippmann *super-duty* rockfeeder. We are therefore presenting a photograph of the super-duty feeder, which uses rollers in place of a chain.

Plates of the super-duty conveyor are made of cast steel, while those of the heavy-duty feeder are of plate steel.

Uses rollers, cast steel plates.

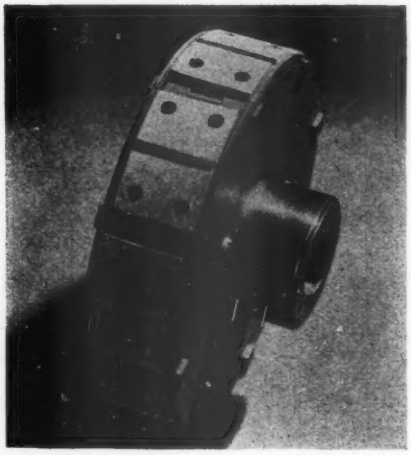
● Oil Filter

An activated ceramic block oil refill filter for the removal of soluble and insoluble contaminants has been developed by the Briggs Filtration Company, Bethesda 14, Md.

Illustrated is refill No. A-445, a combination ceramic block and felted cellulose refill. It is recommended for general service use where the engine is lubricated with straight mineral oils. The ceramic material may be either fuller's earth, bauxite or alumina, depending upon the type of oil to be clarified.

● Clutch

A mercury-actuated clutch developed by Mercury Clutch Corporation of Canton, O., makes possible automatic starting of air compressors. The clutch permits the driving motor to attain full speed before the compressor turns, eliminating the need for pressure release valves.



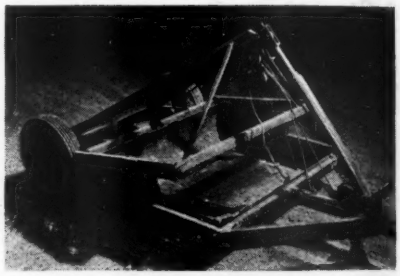
Mercury-actuated.

This automatic clutch incorporates a "time delay" factor which retards the engagement for a second or more, long enough to permit the motor to come up to full speed before any load is applied. The motor is then able to bring to bear its greatest torque plus the inertia of its rotor to start the load. Motor current is reduced and the starting windings are protected.

Mercury (quicksilver) is used as the control medium because of its high specific gravity. Centrifugal force acting on a small amount of mercury produces hydraulic pressure which is dependent upon the "head" of mercury rather than the amount. This pressure is utilized without levers or other mechanical means, to cause the engagement of the friction elements of the clutch. The manufacturer has developed standard clutches for all types of electric motors up to 15 hp. and for internal combustion engines.

● Earthmover

Designed for use where heavy equipment cannot operate, the new "Scoopmaster" has been found capable of carrying more than 1 cubic yard of dirt per load. Being equipped with a hydraulic lift, it loads, hauls, dumps or spreads

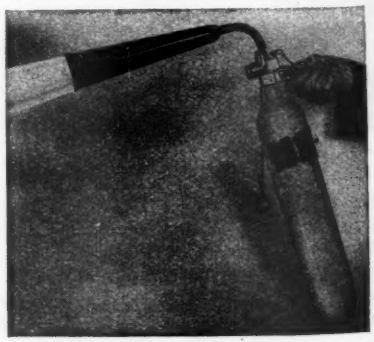


Can be used as grader.

without making a stop. Its cutting blade is of such design that it can be tipped on end and used as a grader. Manufacturers of the Scoopmaster are the Maquoketa Company, Maquoketa, Ia.

● Midget Extinguisher

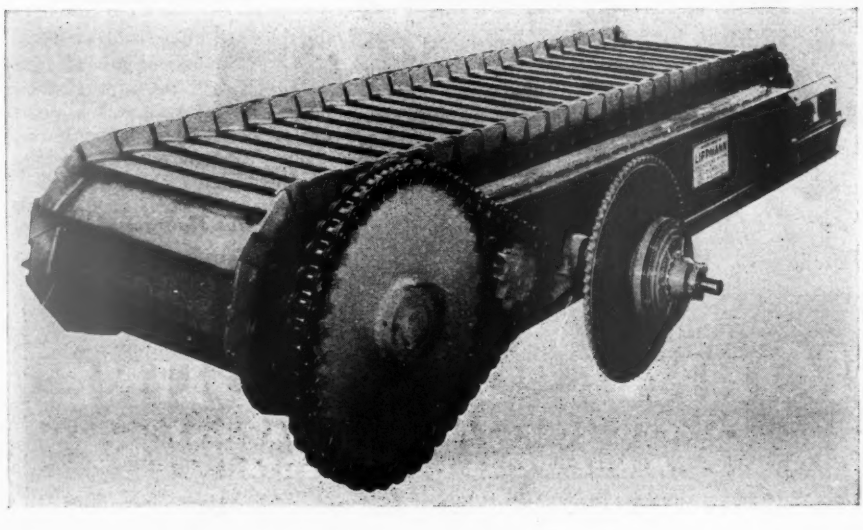
A new midget fire extinguisher, the "Alfco Speedex," has just been announced by the American-LaFrance-Foamite Cor-



Squeeze-type valve.

poration of Elmira, N. Y. The device and its contents weigh 3⅝ pounds. The material expands upon release to 450 times its contained volume.

The extinguisher is 3 9/16 in. in diameter, with an over-all length of 22 in. It is operated by a quick-acting squeeze-type valve which releases the carbon dioxide extinguishing agent by palm pressure.



Temperature Control

Especially designed for temperature control where indicating and recording are not required is the function of the new Electromax, designed by Leeds & Northrup Company, 4934 Stenton Avenue, Philadelphia 44, Pa.

The instrument consists of a Wheatstone bridge circuit with a vacuum-tube

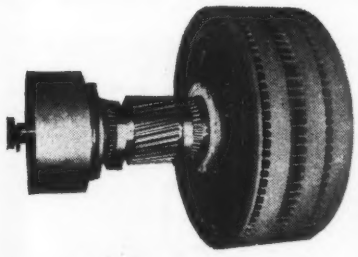
Uses vacuum tubes.

amplifier as the detector. Vacuum tubes are standard, require no matching, balancing, or other special selection.

The instrument case can be mounted wherever convenient. Standard ranges are 0 to 250 deg. and 0 to 1000 deg. and the corresponding ranges of the centrigrade scale.

Hoist Drive

The P&H "Magnetorque" hoist drive is now offered as standard equipment on Harnischfeger 6-yard electric shovels, according to announcement received from the company. The action of the two concentric electric magnets, one rotating



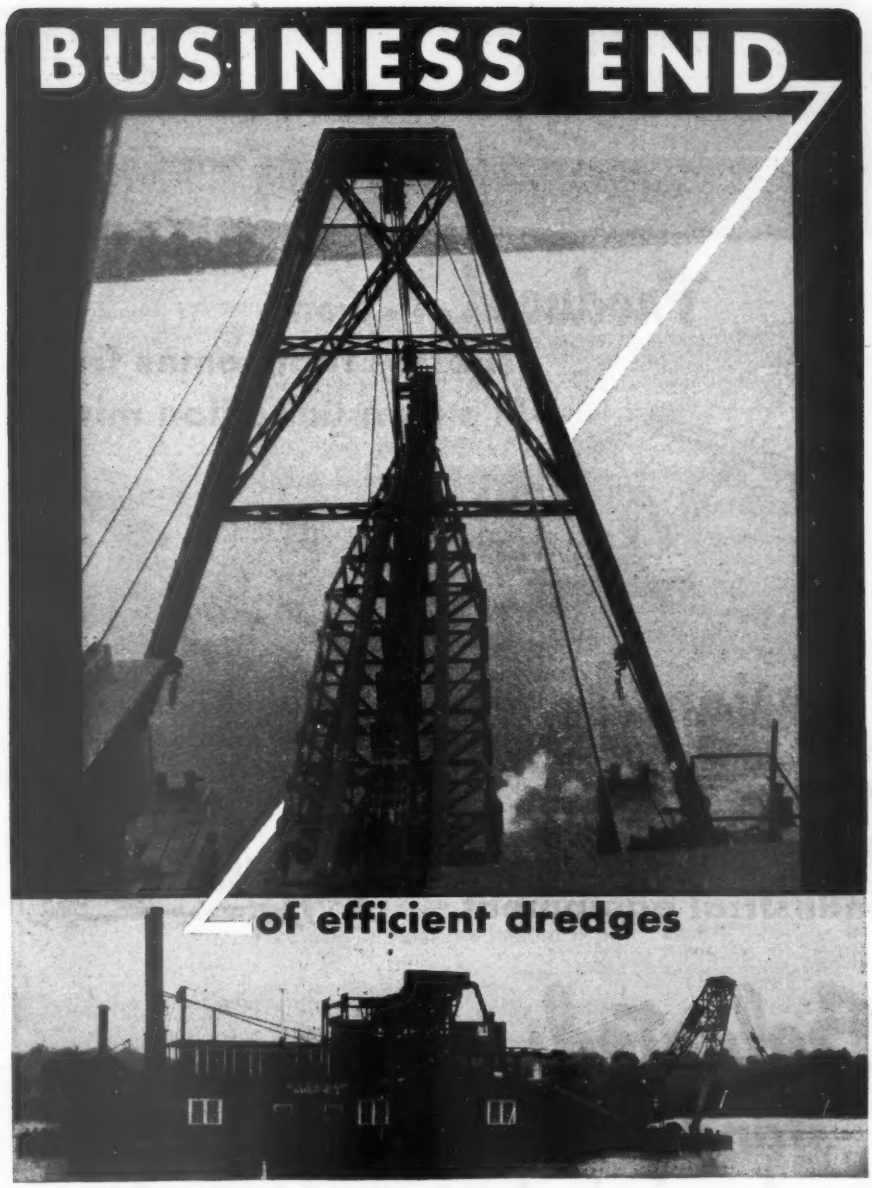
Cushions shock loads.

within the other, is comparable to the transmission control of a fluid drive.

The amount of torque to be transmitted is controlled through variable energizing of the magnetic field. Advantages claimed for this type of control are: the elimination of customary hoist generator and its maintenance and the cushioning of shock loads.

Truck Tire

A new truck tire with all plies constructed of newly-perfected nylon cords designed for heavy-duty truck service has been developed by the Goodyear Tire & Rubber Company. Goodyear states that a 12-ply rating all-nylon truck tire carcass has 50 percent greater strength than a 12-ply tire of comparable size constructed of the best rayon tire cords yet developed.



THE EAGLE "SWINTEK" DREDGING LADDER

You're looking at the business end of the E. T. Slider Inc. Dredge No. 5 in the photograph above—recent modernization of this dredge included installation of the 15″-75′ Eagle "Swintek" Dredging Ladder shown. Note side braces for additional strength to permit underwater traversing of ladder for more thorough clean up of deposit. "Swintek" was the choice because a similar installation on Dredge No. 4 has, for 17 years, given a 30% increase in production . . . has eliminated previous difficulty with boulders and penetration of hard pan. About this new dredging ladder, Mr. Slider says, "Our Swintek cutter and ladder work perfectly."

Continuous operation . . . even flow of materials . . . reduced wear on pump . . . deeper dredging . . . dredging of hard packed material—the Eagle "Swintek" gives you all these important advantages. Continuous traveling chain keeps oversize away from nozzle and out of system—eliminates clogging and damage. Chain cutter bars cut and loosen deposit to increase volume pumped. Send for Catalog 745.

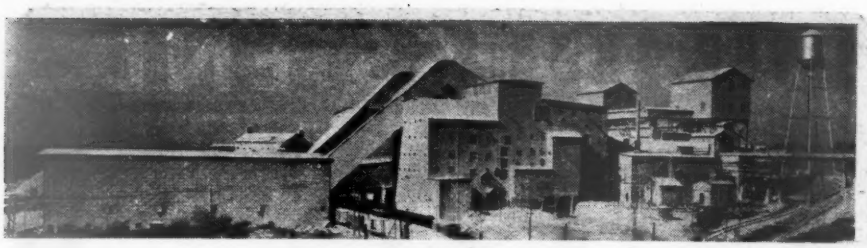
75th Anniversary 1872-1947 Progress...Service

Sand and Gravel Equipment

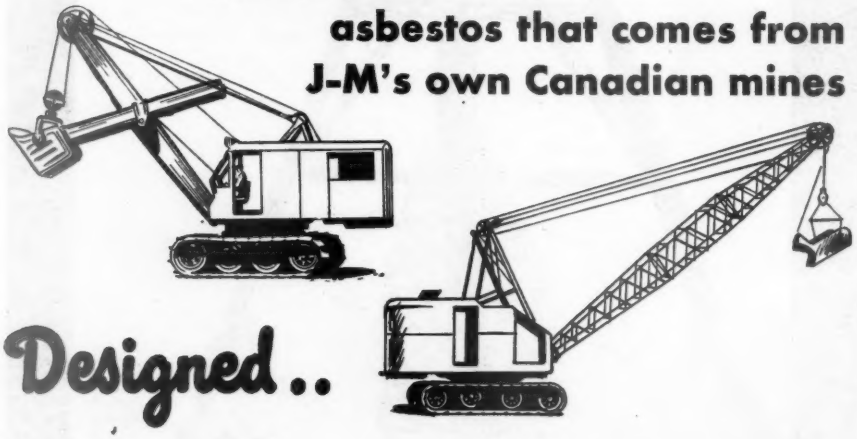
"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS

EAGLE IRON WORKS

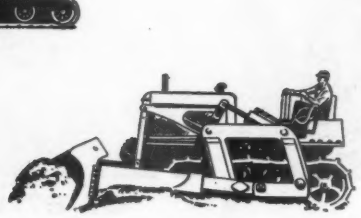
133 Holcomb Ave. • Des Moines, Iowa



Produced... from asbestos that comes from J-M's own Canadian mines



Designed.. flexible or rigid... for every type of industrial equipment



Selected.. as standard equipment by the leaders in industry everywhere

LEADING INDUSTRIAL EQUIPMENT MANUFACTURERS have standardized on J-M Industrial Friction Materials for rugged service . . . sure stops. The reason—they know that Johns-Manville selects only the highest quality, long-fiber asbestos . . . then controls this quality right through to the finished friction material.

Stay with Johns-Manville and you're sure of the best! For help in selecting the proper style of J-M Friction Material, consult your nearest J-M Distributor . . . or write direct to Johns-Manville, Box 290, New York 16, N. Y.

JM PRODUCTS

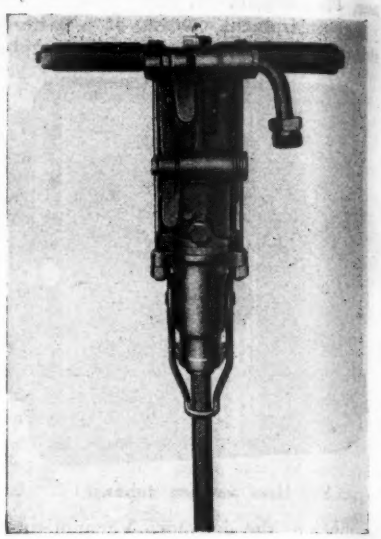
Johns-Manville

INDUSTRIAL FRICTION MATERIALS

No. 1 With Leading Manufacturers

● Rock Drill

The Ingersoll-Rand Company, Phillipsburg, N. J., has announced a new product, a lightweight rock drill in the 30 pound class, the J-30 Jackhammer. This new rock drill was designed for drilling

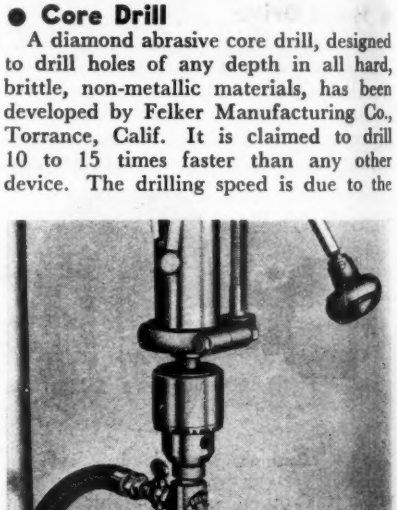


For medium to hard rock.

medium to hard rock. An outstanding feature is the three-in-one backhead which allows the machines to be easily converted to any one of three types of machines—wet, dry, or blower type.

● Core Drill

A diamond abrasive core drill, designed to drill holes of any depth in all hard, brittle, non-metallic materials, has been developed by Felker Manufacturing Co., Torrance, Calif. It is claimed to drill 10 to 15 times faster than any other device. The drilling speed is due to the



Cool at high speed.

method of supplying coolant through the drill stem to the special metal-bonded diamond abrasive rim. Chips and sludge are flushed from the kerf as fast as developed; and since the coolant supply is constant, it is claimed that the drill functions without heat, regardless of hole depth.

On most operations coolant from the local water main is satisfactory.

TRADE NOTES

Fred H. Jusenius

Enlargement of the duties of Fred H. Jusenius, for the last year general sales manager of the Diamond Iron Works, Inc., Minneapolis, has been announced. He is now director of the company and vice-president in charge of sales, both for Diamond and for the Mahr Manufacturing Company Division products.

Mr. Jusenius served as a member of the sales force for both Bucyrus-Erie and LeTourneau, in domestic and foreign fields, before joining Diamond.

E. L. Berry

E. L. Berry, Link-Belt vice-president in charge of production, died unexpectedly on April 3 after suffering a heart attack. He had been with the Link-Belt Company since 1914, when he was employed as a machinist at the Pershing Road plant in Chicago.

Mr. Berry held several important positions in the firm and during World War II served as vice-president and general manager of the wartime subsidiary Link-Belt Ordnance Company, now dissolved.

The Cummins Engine Company, Inc., Columbus, Ind., has announced the following appointments: Walter N. Westland, Eastern regional manager, with

W. N. Westland

G. W. Stevens

headquarters in the Chrysler Building, New York City, and George W. Stevens, Mid-Continent regional manager. Mr. Stevens will be located at the Fair Building, Fort Worth, Tex.

Burton A. Ford, vice-president of the St. Regis Sales Corporation and manager of the Mid-Atlantic District, Multiwall Bag Division, announces the removal of the firm's district headquarters office to 842 Hamilton Street, Allentown, Pa., effective April 1, 1947.

Meet today's cement demand *today* with TDA

Mr. Production Executive—TDA is the answer to your problem of increasing finish mill output immediately—right now—without the need for fixed capital investment or long delays for delivery of new equipment. We make this claim based on over ten years plant experience where we have seen TDA increase finish mill production up to 30%—time and time again.

And a second advantage you get from using TDA is that you can terminate its use when the present increased demand returns to normal and your plant will not be loaded with an expensive fixed investment in unneeded equipment purchased at inflated prices.

As to cost, the increased production more than pays for the TDA used in reduced finish mill grinding costs. In addition, you know that every barrel of cement you produce over normal production is pure "gravy."

We don't claim that TDA is a cure-all for every production problem, but if your plant has a bottleneck in the finish grinding mills, we believe it is worth investigating to see what TDA can do in your mills. Our experienced engineers will be glad to show you how TDA has worked profitably in many other plants.

DEWEY AND ALMY CHEMICAL CO.

CHICAGO, ILL. CAMBRIDGE 40, MASS. OAKLAND, CAL.

IF YOU HAVE A DRY PROCESS PLANT AND RAW GRINDING IS A BOTTLENECK . . . TRY RDA

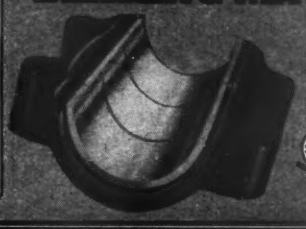
Bearings Wear too Fast?

Repour next time with one of the MAGNOLIA BEARING METALS.

Lead-base alloys have a much lower coefficient of friction than any other bearing metal—*1/3 that of "genuine" babbitt.* The graphite treatment insures partial self-lubricating.

Ask your dealer—or us—for bulletin with tips on pouring.

MAGNOLIA BEARING METALS



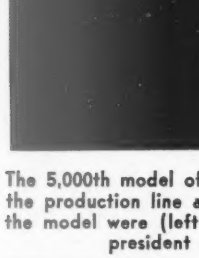
Look for the Flower Trade Mark

MAGNOLIA METAL COMPANY

24 WEST JERSEY STREET ELIZABETH 4, N. J.

Warehouses in Ft. Worth, Chicago, San Francisco and Montreal

The 5,000th model of the "Tournapull," a rubber-tired earth-moving unit, recently came off the production line at the Peoria, Ill. plant of R. G. LeTourneau, Inc. On hand to inspect the model were (left to right): S. D. Means, domestic sales manager, O. W. Nelson, vice-president and general manager, and P. E. Fulford, export manager.



A. R. Robinson

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Mr. Robinson joined the Roebling Company in 1936 as a salesman in the Portland branch. Previously he was engaged in contracting work.

Stanley D. Michaelson has been appointed director of the basic industries research laboratories of the Allis-Chalmers Manufacturing Company of Milwaukee. He also continues to serve as ore-processing engineer.

Fred C. Bond, who was formerly director of the laboratories, has been named technical director for the basic industries department.

C. M. Donahue is now manager of the mining department of the Mine Safety Appliances Company of Pittsburgh. He has been with the firm for the last 20 years and became manager of the sales engineering and planning department in 1946.

The New Orleans Armature Works, 1119 Poeyfarre St., New Orleans, has been appointed distributor of Davey industrial compressors for Louisiana and Mississippi by the Davey Compressor Co., Kent, O. The new distributor will handle the complete Davey industrial line, specializing in the sales and service of departmental "on-the-job" compressors of 60 to 315 cu. ft. capacities.

Pioneer Engineering Works, Inc., of Minneapolis, announces the appointment of two new distributors in Montana. Central Machinery Company, Great Falls, will serve the northwestern part of the state and Wortham Machinery Company, Billings, the southwestern area.

Harlowe Hardinge, president of the Hardinge Company, Inc., York, Pa., has been elected president of the Manufacturers' Association of York.

Rollway Bearing Company, Inc., has moved its Chicago offices to room 3716, 20 N. Wacker Drive.

The company has also opened a new sales office in the Renshaw Building, 9th Street at Liberty, Pittsburgh, Pa., with John B. Bell in charge.

The Independent Pneumatic Tool Company of Chicago, manufacturers of Thor portable pneumatic and electric tools, have opened a technical office at Sao Paulo, Brazil. Reuben P. Rudy will be manager of the new office.

The International Paper Products Division of the International Paper Company, New York City, will open a branch sales office at 269 Erie Boulevard, West, Syracuse, N. Y., under the management of M. A. Scholl.

J. J. Wilson, Seattle, Wash., branch manager for John A. Roebling's Sons Company, died on March 6. He had been with the firm since 1920.

One of the programs recently telecast in St. Louis was "The King's Other Life," a new sound-motion picture produced by Bemis Bro. Bag Co. The film shows the complete bag manufacturing processes from the initial cotton picking operation through all manufacturing stages to the completed bag.

The Big Three Welding Equipment Company, Inc., of Fort Worth, Tex., recently announced the opening of their new sales and supply office, located at 565 West Commerce St., Dallas, Tex.

• This 360,000-pound hydraulic press exerts a total pressure of 3,040 tons in vulcanizing conveyor belting for the Cincinnati Rubber Manufacturing Company, Cincinnati, O. The pressure is transmitted by eight 22-in.-diameter rams activated by hydraulic pressure of 2,000 pounds p.s.i. Belts up to 54 inches wide and 1,000 feet long are produced. Shown with the press is J. F. Joseph, president of the Cincinnati Rubber Manufacturing Company.

Legal Decisions

By LEO T. PARKER
Attorney at Law

Law of Fixtures

It seems that owners of cement, sand and gravel, quarry, and the like plants do not realize that they do not own newly-installed legal fixtures and equipment in mortgaged or leased buildings.

The latest higher court decision involving this important point of law is *First Nat. Bank v. Nativi,* 49 Atl. (2d) 760, reported February, 1947. The testimony in this case showed that brothers named Booth conducted a granite business on their own property. The compressor and motors were used to furnish air and electric power for the granite cutting business conducted on the premises by the Booth Brothers.

The brothers mortgaged the real property to a bank and *later* purchased an air compressor and the two motors which were installed in a lean-to adjoining the main building. In order to do so it was necessary to remove, and afterward to replace, one end of the lean-to. Concrete bases were constructed on which to place the compressor and the motors that operated it in order to lessen vibration. After installation of this new equipment the bank contended that it could not be removed from the building. The bank's contention was that although the equipment was not on the property when its mortgage was signed, yet the equipment is a "legal fixture" which belongs to the real property. This contention was vigorously denied and a law suit resulted, but the higher court held that this equipment belonged to the bank although, as above explained, it was not on the premises when the brothers mortgaged it to the bank. This court held that where a building or premises are specially adapted to certain uses, all machinery attached thereto which is essential to the purpose to which the building is devoted belongs to the building and real premises, because it is a legal fixture.

A review of late and leading higher court decisions discloses that the test whether equipment is a legal fixture involves three elements: (1) the annexation of the article, whether actual or constructive; (2) its adaptation to the use of the realty to which it is annexed; and (3) the intention with which the annexation has been made, whether or not to make it a permanent accession to the freehold. The determination of the question does not rest upon any of these elements alone, but upon a consideration of all of them together. The present day tendency is to regard the manner of annexation taken by itself as of relatively small significance, and to give much weight to the adaptation of the machine to the use of the realty, considered in connection with the intention with which the annexation has been made.

Thus, if one rents or leases real property, or mortgages his own real property, he cannot at any time subsequently remove from the premises any legal fixtures.

Not Silicosis

The Workmen's Occupational Diseases Act should receive a liberal construction to effectuate its purposes, but the courts will not extend it to embrace cases which cannot reasonably be interpreted as coming within its scope.

For example, in *Reid v. Ontario Mfg. Company,* 70 N. E. (2d) 357, reported March, 1947, an employee sued to recover compensation claiming that he was suffering from silicosis which arose out of and in the course of his employment. The higher court refused to award compensation and explained that the evidence was conflicting, but that several doctors reported that he had not contracted silicosis; that there was no evidence of silicosis; and that there was no evidence of industrial disease.

Statute of Limitations

All states have laws which outlaw suits not filed within the period specified by these laws.

In *Granville v. Kunz,* 24 N. W. (2d) 598, it was shown that a contractor excavated property in year 1937. A state law provides that suits for damages caused by "caveins" must be filed within six years. An adjoining property owner sued the contractor in 1944, or seven years after the job was completed.

The higher court held that the suit was not "outlawed" because limitation statutes do not begin to run until the complaining

When properly used Page AUTOMATIC Buckets will outdig ordinary buckets of comparable size.

That's a guarantee you can easily prove for yourself by a competitive test. Compare the production of your present bucket with that of an AUTOMATIC. Hundreds of dragline operators in all kinds of digging have found that their AUTOMATIC buckets dig more yards at a lower cost per yard than any other dragline bucket they have ever used.

Here's why: Page AUTOMATICS dig right in at the first pull on the load line and get a full pay load within one to three bucket lengths regardless of the depth — 20 ft., 100 ft. or more. This means that most of your operations are under or near the end of the boom point where the minimum amount of power is required for hoisting the load. Perfect balance of the AUTOMATIC assures perfect control whether loading or dumping. Quick loading features of AUTOMATIC buckets mean less wear and maintenance on the bucket, cables and the dragline as well as minimum operator fatigue. For more complete details, see your own construction equipment distributor or write for new booklet "How to Get the Most Out of Your Page Automatic Dragline Bucket."

PAGE ENGINEERING COMPANY
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PAGE Automatic
DRAGLINE BUCKETS and WALKING DRAGLINES

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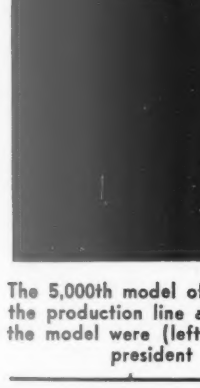

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Fred C. Bond, who was formerly director of the laboratories, has been named technical director for the basic industries department.

C. M. Donahue is now manager of the mining department of the Mine Safety Appliances Company of Pittsburgh. He has been with the firm for the last 20 years and became manager of the sales engineering and planning department in 1946.

The New Orleans Armature Works, 1119 Poeyfarre St., New Orleans, has been appointed distributor of Davey industrial compressors for Louisiana and Mississippi by the Davey Compressor Co., Kent, O. The new distributor will handle the complete Davey industrial line, specializing in the sales and service of departmental "on-the-job" compressors of 60 to 315 cu. ft. capacities.

Pioneer Engineering Works, Inc., of Minneapolis, announces the appointment of two new distributors in Montana. Central Machinery Company, Great Falls, will serve the northwestern part of the state and Wortham Machinery Company, Billings, the southwestern area.

Harlowe Hardinge, president of the Hardinge Company, Inc., York, Pa., has been elected president of the Manufacturers' Association of York.

Rollway Bearing Company, Inc., has moved its Chicago offices to room 3716, 20 N. Wacker Drive.

The company has also opened a new sales office in the Renshaw Building, 9th Street at Liberty, Pittsburgh, Pa., with John B. Bell in charge.

The Independent Pneumatic Tool Company of Chicago, manufacturers of Thor portable pneumatic and electric tools, have opened a technical office at Sao Paulo, Brazil. Reuben P. Rudy will be manager of the new office.

The International Paper Products Division of the International Paper Company, New York City, will open a branch sales office at 269 Erie Boulevard, West, Syracuse, N. Y., under the management of M. A. Scholl.

J. J. Wilson, Seattle, Wash., branch manager for John A. Roebling's Sons Company, died on March 6. He had been with the firm since 1920.

One of the programs recently telecast in St. Louis was "The King's Other Life," a new sound-motion picture produced by Bemis Bro. Bag Co. The film shows the complete bag manufacturing processes from the initial cotton picking operation through all manufacturing stages to the completed bag.

The Big Three Welding Equipment Company, Inc., of Fort Worth, Tex., recently announced the opening of their new sales and supply office, located at 565 West Commerce St., Dallas, Tex.

• This 360,000-pound hydraulic press exerts a total pressure of 3,040 tons in vulcanizing conveyor belting for the Cincinnati Rubber Manufacturing Company, Cincinnati, O. The pressure is transmitted by eight 22-in.-diameter rams activated by hydraulic pressure of 2,000 pounds p.s.i. Belts up to 54 inches wide and 1,000 feet long are produced. Shown with the press is J. F. Joseph, president of the Cincinnati Rubber Manufacturing Company.

Legal Decisions

By LEO T. PARKER
Attorney at Law

Law of Fixtures

It seems that owners of cement, sand and gravel, quarry, and the like plants do not realize that they do not own newly-installed legal fixtures and equipment in mortgaged or leased buildings.

The latest higher court decision involving this important point of law is *First Nat. Bank v. Nativi,* 49 Atl. (2d) 760, reported February, 1947. The testimony in this case showed that brothers named Booth conducted a granite business on their own property. The compressor and motors were used to furnish air and electric power for the granite cutting business conducted on the premises by the Booth Brothers.

The brothers mortgaged the real property to a bank and *later* purchased an air compressor and the two motors which were installed in a lean-to adjoining the main building. In order to do so it was necessary to remove, and afterward to replace, one end of the lean-to. Concrete bases were constructed on which to place the compressor and the motors that operated it in order to lessen vibration. After installation of this new equipment the bank contended that it could not be removed from the building. The bank's contention was that although the equipment was not on the property when its mortgage was signed, yet the equipment is a "legal fixture" which belongs to the real property. This contention was vigorously denied and a law suit resulted, but the higher court held that this equipment belonged to the bank although, as above explained, it was not on the premises when the brothers mortgaged it to the bank. This court held that where a building or premises are specially adapted to certain uses, all machinery attached thereto which is essential to the purpose to which the building is devoted belongs to the building and real premises, because it is a legal fixture.

A review of late and leading higher court decisions discloses that the test whether equipment is a legal fixture involves three elements: (1) the annexation of the article, whether actual or constructive; (2) its adaptation to the use of the realty to which it is annexed; and (3) the intention with which the annexation has been made, whether or not to make it a permanent accession to the freehold. The determination of the question does not rest upon any of these elements alone, but upon a consideration of all of them together. The present day tendency is to regard the manner of annexation taken by itself as of relatively small significance, and to give much weight to the adaptation of the machine to the use of the realty, considered in connection with the intention with which the annexation has been made.

Thus, if one rents or leases real property, or mortgages his own real property, he cannot at any time subsequently remove from the premises any legal fixtures.

Not Silicosis

The Workmen's Occupational Diseases Act should receive a liberal construction to effectuate its purposes, but the courts will not extend it to embrace cases which cannot reasonably be interpreted as coming within its scope.

For example, in *Reid v. Ontario Mfg. Company,* 70 N. E. (2d) 357, reported March, 1947, an employee sued to recover compensation claiming that he was suffering from silicosis which arose out of and in the course of his employment. The higher court refused to award compensation and explained that the evidence was conflicting, but that several doctors reported that he had not contracted silicosis; that there was no evidence of silicosis; and that there was no evidence of industrial disease.

Statute of Limitations

All states have laws which outlaw suits not filed within the period specified by these laws.

In *Granville v. Kunz,* 24 N. W. (2d) 598, it was shown that a contractor excavated property in year 1937. A state law provides that suits for damages caused by "caveins" must be filed within six years. An adjoining property owner sued the contractor in 1944, or seven years after the job was completed.

The higher court held that the suit was not "outlawed" because limitation statutes do not begin to run until the complaining

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". . . . well over 150,000 tons of quarry run material with this single Breaker and maintenance is practically nil. Previous conventional equipment incurred a wear factor of 28 cents per ton. Under identical conditions, we now operate the New Holland Breaker with a wear factor of 3½ cents per ton." Signed W. F. Sharpe.

It's a power saver, too. High fines production is demanded in this Iowa quarry . . . that means stepping up impeller speeds. Even at 1000 r.p.m. these finely balanced impellers used only 80 h.p. each . . . producing 100% aggregate passing 1" screens, 65% passing eight mesh.

Simple Breaker adjustments give you any size aggregate you want . . . from ag lime to road ballast. For complete details, write Dept. T-5, New Holland Manufacturing Company, Mountville, Pa.

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DOUBLE IMPELLER BREAKERS
PRIMARY AND SECONDARY CRUSHING IN ONE OPERATION

property owner *discovers* the cavein, or damage to his property. This court held that the property owner was entitled to recover damages, based on the cost of building a concrete retaining wall along the excavation on the adjoining land.

For comparison see *Hickman v. Wellauer*, 169 Wis. 18. Here the higher court held that the correct measure is the diminution in value of the land or the cost of a retaining wall, whichever is the lesser.

Measure of Damages

Modern higher courts consistently hold that the measure of damages for permanent injuries to land as result of a permanent nuisance is the difference between the reasonable value of the land immediately before and immediately after the injury.

For instance, in *Goodyear Tire & Rubber Company, Inc., v. Gadsden Sand & Gravel Company, Inc.*, 25 So. (2d) 578, reported January, 1947, the Gadsden Sand & Gravel Company, Inc., sued Goodyear for $100,000 damages contending that the corporation had erected a dam on its property which prevented natural flow of surface waters and caused seepage and percolation. The Gadsden Sand & Gravel Company, Inc. owns property from which it had mined and was mining, selling and hauling away large quantities of building and moulding sand. It was contended that the dam caused water to accumulate, overflow and stand on the property of the Gadsden Sand & Gravel Company, Inc., and caused the sand to become damp and saturated. According to the testimony water does not damage building sand and gravel, but when moulding sand, which is used in pipe manufacture, etc., becomes damp or saturated with water, it is worthless while in this condition. The higher court held that the Gadsden Sand & Gravel Company, Inc., could recover damages equal to the difference between the value of its property before and after the dam was constructed.

Two Innocent Persons

Very frequently, in transactions involving sales of machinery, equipment, etc. one of two *innocent* persons must suffer. The courts always hold that the one whose fault *resulted* in the controversy must bear the loss.

For example, in *Union Bank & Trust Company v. Murphy Transp. Company*, 24 N. W. (2d) 796, reported January, 1947, it was shown that a seller named Young and a buyer of a second-hand motor truck went to a bank to borrow money, and to execute a mortgage on the automobile so that the buyer could make the purchase. The seller of the automobile told the president of bank that if he loaned the money he, the seller, would go to the county treasurer and comply with the state statute respecting transfer of the certificate of registration. The president of the bank loaned the purchase money but the seller did *not* comply with the statute, and did *not* transfer the certificate. Later it developed that another namely, the Murphy Company, held a conditional contract of sale recorded in *another county* on the automobile, which had not been paid or satisfied. This conditional contract had not been recorded strictly in accordance with state laws.

The bank, which held the unpaid and properly recorded mortgage, sued Murphy Company to recover possession of the car.

The higher court held that the bank could take possession of the automobile, and said:

"The controversy is one of those in which unfortunately one of two innocent parties must suffer a substantial loss, . . ."

Implied Guarantee

Sometimes the higher courts imply a guarantee where the contract fails to specify a guarantee. This law is applicable to both written and verbal contracts. In fact modern higher courts consistently hold that if during the discussion between a buyer and seller *before* a sale contract was made the buyer relied on the seller's judgment there *is an implied* warranty that the subject of the sale shall be reasonably fit for the buyer's intended purpose.

For example, in *Nichols Company v. Fuller*, 22 So. (2d) 243, it was shown that a person named Fuller purchased a used motor vehicle and paid $123.41 in cash, agreeing to pay the remainder in 18 monthly installments.

Shortly afterward Fuller discovered that the mechanism of the vehicle was in very bad condition. The lower court decided that the seller had breached an "implied" warranty and that Fuller had the right to return the vehicle to the seller and get his money back. The higher court held:

"On the rescission of this sale by the appellee (Fuller), it became the duty of the appellant (seller) to return to him the money paid."

Municipal Contract Void

Modern higher courts consistently hold that sellers who sell merchandise to municipalities *in violation* to state laws *cannot* recover any payment.

In *Welch Company v. Kansas City, Missouri*, 194 S. W. (2d) 207, it was shown that a state law states that no contract for labor or materials furnished to municipalities is valid or binding unless *in writing*. A company sold rock and other materials and also performed valuable services for a municipality on *verbal* orders given by an official of the municipality. The higher court held that the seller could not recover any payment, saying:

"There is no evidence that there was not time for plaintiff (contractor) to enter into a written contract with the city for the doing of the work without resulting in serious harm to any one."

Must Issue Bill of Sale

According to a recent higher court the seller of equipment who neglects to issue a bill of sale to the purchaser stands to lose the money paid.

For illustration, in *Buss v. McKee*, 170 Pac. (2d) 268, it was shown that a corporation sold a motor truck to a man named Johnson and neglected to issue a bill of sale to Johnson. Later a man

named Russ loaned $400 to Johnson, and took a mortgage on the truck from Johnson to secure the loan.

In subsequent litigation the higher court held that since the seller withheld the certificate of ownership until the truck was resold to an innocent purchaser, the seller was liable for Buss' loss of his mortgage lien.

Read Your Insurance Policies

Failure of an insured to read his insurance policy does *not* excuse him from future liability nor result in an insurance company being obligated beyond the *actual words used* in the policy.

See *Brown v. Jones,* 4 Fed. Cas. 404. This policy stated that the insured was protected against injuries to employees in his plant "or elsewhere."

The court held that this policy did *not* cover the insured employer for injuries sustained by employees in any location *off* the company's premises.

For comparison see *Corder v. Morgan Gravel Company,* 195 S. W. (2d) 441. Here it was shown that the Morgan Company held a liability insurance policy covering all work done in its plant and "elsewhere in the state of Missouri." A truck driver was killed on a highway in the state.

The higher court held that the insurance policy protected the Morgan Company against damage suits filed by the deceased employee's dependents.

Total Disability

According to a recent higher court an employee may be "totally" disabled and receive full compensation, under the State Workmen's Compensation Act, although he works and receives wages in another kind of work.

For example, in *Syrjala v. Castile Mining Company,* 25 N. W. (2d) 136, reported February, 1947, a state law was litigated which states that a totally disabled employee should receive $3,000 as compensation.

An employee became totally disabled to perform his work and was removed by his employer from further exposure to the silica hazard. Thereafter he received lesser wages than he had received for his regular work. His employer gave him other employment. The employee filed suit and claimed that because he has contracted silicosis in the employment and was totally disabled thereby for employment in his regular occupation, he is entitled to receive compensation in total payment of $3,000. The higher court agreed with this contention.

Beware of Zoning

Frequently quarry corporations expend and lose a large amount of money when not knowing the law pertaining to "zoning."

Modern higher courts consistently hold that if a quarry was being operated *before* residences were constructed in the neighborhood, a zoning ordinance or law cannot prevent further operation of the quarry. But if a zoning law is passed *before* operation of the quarry, then the quarry cannot be operated.

For illustration, in *Davidson County v.*

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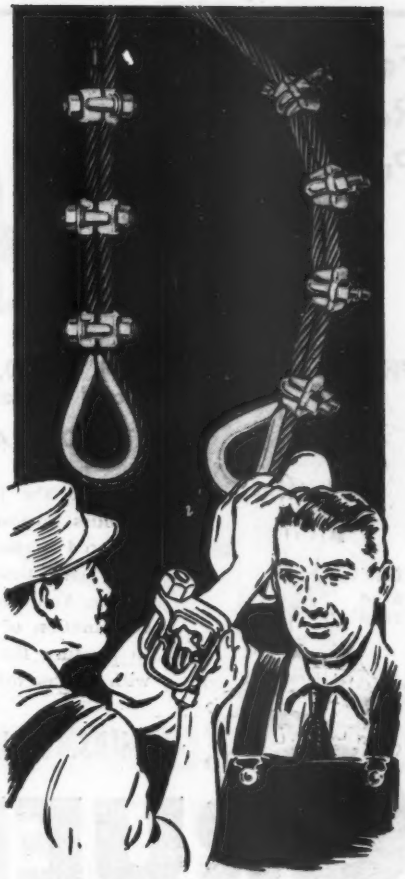

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"Fist-Grip" Clips are available at your supply house. Look for the "L" trade-mark. Write for fitting catalog: Dept. 3, The Thomas Laughlin Co., Portland 6, Maine.

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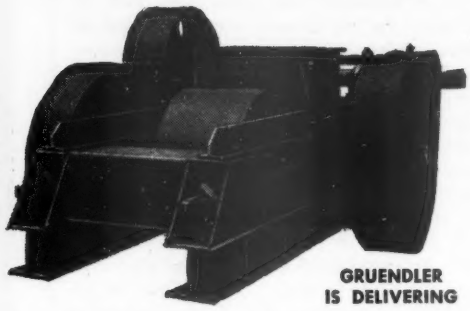

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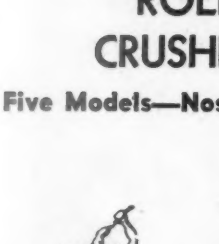

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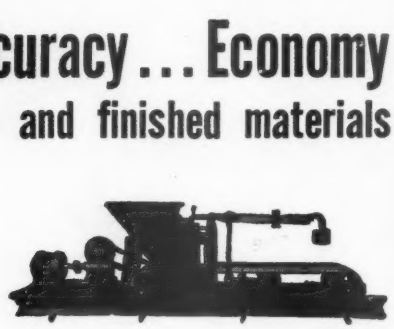

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Rogers Stone Quarry, 198 S. W. (2d) 812, reported March, 1947, it was shown that a corporation intended to operate a quarry which would net a profit of $600 a day.

A county commission was authorized by a state law to "zone" various sections of the county. After the Rogers Stone Quarry had acquired certain land, a large number of home owners in the general vicinity protested to the Zoning Commission against the installation and operation of a stone quarry on the property. The commission issued a resolution prohibiting the operation of a quarry on the land recently acquired by the Rogers Stone Quarry. The latter appealed to the higher court which, however, upheld the new zoning law, and said:

"The defendants (Rogers Stone Quarry) at the time of the passage of the resolution had not commenced the operation of a quarry, nor declared their intention to do so; they did not commence the operation until a year after the resolution had become law; the area zoned is suitable for residential development, and the natural future growth and development of the suburban district makes that development entirely probable. We find the effect of the resolution is for the general welfare and we cannot find that the resolution assailed is arbitrary or unconstitutional."

Also, see *West Bros. Company v. City of Alexandria,* 169 Va. 271, and Quarry, 147 Cal. 609. Both of these higher courts held that a state, county or city can legally forbid the operation of quarries, where people live or are accustomed to move in the immediate vicinity, and the quarry had *not* been operated *before* the residences were constructed in this location.

TRAFFIC News Digest

CENTRAL FREIGHT ASSOCIATION DOCKET

It is proposed to establish in docket 83077 on agricultural limestone, unburned, in bulk in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full visible or cubical capacity, actual weight will apply, rates as follows:

From Genoa, O., to the Following Ohio Points	Per Net Ton
Aurora, North Randall	127c
Braceville, Windham	138c
Burghill, Leetonia, Longs, Mineral Ridge, Orangeville	149c
Lisbon	160c

Establish in docket 83086 (2) rates on limestone, ground or pulverized, unburned in open-top cars, carload minimum weight 60,000 pounds from Bay City, Mich., to points shown below:

	Rates Subject to Exparte 162 Increase
Hemlock, Mich.	84 cents
Akron and Flint, Mich.	94 cents
Holly, Mich	113 cents
Brown City, Highland, and Lake, Mich.	119 cents

Ashley and Greenville, Mich..	129 cents
Bad Axe and Blanchard, Mich.	123 cents
Clarence and Marion, Mich...	133 cents
Deckerville and McBain, Mich.	139 cents

Docket 83091 (2)—Establish on agricultural limestone, carload minimum weight 90 percent of marked capacity of car, except that when loaded to full cubical or visible capacity, actual weight will apply. From Bloomington, Ind., to the following points:

Bloomfield, Linton, Sullivan and Switz City, Ind.....	66 cents
Palestine and Robinson, Ill...	85 cents

The above rates are subject to Ex Parte 162 increase.

Docket 83120 (2)—Proposed to establish rates on limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds, from Conneaut, O., to the following points in New York:

	Per Net Ton
Corning	226 cents
Lakeville, Silver Springs, Livonia and Mt. Morris.....	193 cents
LeRoy	187 cents
Prattsburg and Savona	215 cents
Wayland	204 cents

Above rates subject to Ex Parte 162 increase.

Docket 83135 (1)—Establish on limestone, agricultural, ground or pulverized, unburned, in closed equipment, carload minimum weight 60,000 pounds, from Piqua, O., to Paw Paw and South Haven, Mich., 193 cents net ton, subject to Ex Parte 162 increase.

Docket 83126 (2)—Proposed to establish on limestone, agricultural, unburned and crushed stone in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when cars are loaded to full cubical or visible capacity, actual weight will apply, from Perkins, Ind., to representative points in Illinois, rates in cents per net ton, as follows:

Pittwood and Cheneyville....	83 cents
Claytonville and Hoopeston..	88 cents
Momence	94 cents
Paxton	99 cents
Danville	105 cents
Ryan, Jamaica and Metcalf..	110 cents
Paris	116 cents
Ellsworth and Oakland.....	121 cents
Mattoon and Neoga	127 cents

Note: Basic rate subject to increase of 15 cents per ton under Interstate Commerce Commission's order in Ex Parte 162.

DOCKET AND STATUS REPORT OF PRIOR SOUTHERN FREIGHT ASSOCIATION SUBMITTALS

Docket 37195 (shipper; suggested by carrier)—Establish commodity rates on agricultural limestone, bulk, open-top cars, minimum weight 90 percent of marked capacity of car. Rivermines, Mo., to destinations in Alabama, Arkansas, Kentucky, Louisiana, Mississippi and Tennessee on Illinois Central Railroad on the basis of 36 cents per ton higher than rates published from Cedar Bluff, Ky., to same destinations.

Docket 37202—It is proposed to establish rates on agricultural limestone, carload minimum weight, as per item 400 of Southern Freight Tariff Bureau tariff 388-G, ICC 998, Rivermines, Mo., to destinations on G.M.&O. in Mississippi Valley territory in Alabama, Kentucky, Louisiana, Mississippi and Tennessee, observing a basis of 12 cents net ton over Krause, Ill., or 36 cents net ton over Cedar Bluff, Ky., whichever results in lower rate or 12 cents over G.M.&O. rate from Krause, using the rate of G.M.&O. or I.C. to junction or common point, whichever is higher. Rates to intermediate local points are made observing proposed rates to common or junction points as maxima at intermediate local points.

SOUTHWESTERN FREIGHT BUREAU DOCKET

Proposed to establish commodity rates in docket 41831 (1) on agricultural limestone in bulk in open-top cars, minimum weight 90 percent of marked capacity of car, from Rivermines and Flat River, Mo., to destinations in Alabama, Arkansas, Kentucky, Louisiana, Mississippi and Tennessee on the Illinois Central Railroad on a basis of 36 cents per ton higher than rates published from Cedar Bluff, Ky., to the same destinations.

WESTERN TRUNK LINE NEW APPLICATIONS

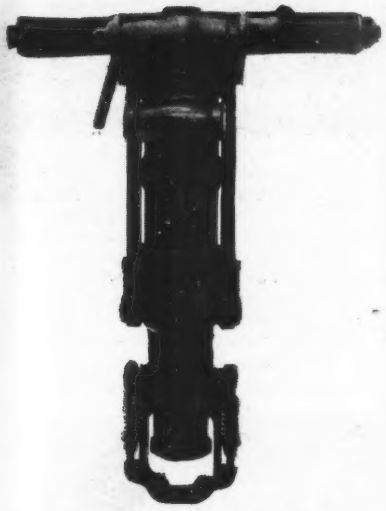
It is proposed in docket E-41-846 to establish on crushed stone, gravel, and sand, carload, from Savannah, Mo., to the following points in Iowa, the following rates per net ton:

Payne, Riverton, Coin and Shambaugh	81c
Clearfield, Hamburg and Lenox...	76c
Clarinda, Farrigut and Page Center, Percival	84c
Bartlett, Hepburn, McPaul and Shenandoah	88c
Essex	93c
Northboro and Braddyville	79c
Bedford	63c
Conway and Merle	70c

Docket E-41-847—Proposed to establish rates of $4.18 per net ton from Valmeyer, Ill., and $4.29 per net ton from Prairie du Rocher, Ill., to St. Francis, Kan., on limestone, crushed or ground, carload.

It is proposed to establish a rate of 13 cents per 100 pounds in Docket E-41-848 on stone, carloads, from Genesee, Wis., to

SCHRAMM ROCK DRILLS



The Schramm D-45 and D-55 Rock Drills are recommended for all classes of drilling, in soft, medium, or hard rock, in either the wet or dry type.

The D-55 is especially recommended for real hard rock and 20 ft. holes.

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Minneapolis, Minnesota Transfer and St. Paul, Minn.

It has been suggested by Southern Ports Foreign Freight Committee Docket 3706-A of April 4 to cancel present rates on lime from Carey and other Ohio producing points to south Florida ports for export, published in item 660 of Central Freight Association Tariff 548-D. They also suggest restricting the export class rates so as to make them non-applicable on export shipments of lime, carloads, from Indiana and Ohio producing points.

Trade Literature

The pieces of literature listed below can be obtained direct from the manufacturers named, or requests can be addressed to Pit and Quarry's "Service to Readers" Department.

AFTERCOOLERS. Bulletin L-802-B2. 7 pages. GENERAL SERVICE PUMPS. Bulletin W-482-B-1. 7 pages. HORIZONTAL DUPLEX PLUNGER POWER PUMPS. Bulletin W-412-B30A. 5 pages. HEAVY DUTY ROTARY PUMPS. Bulletin W-487-B10B. 5 pages. WAGON DRILL. Bulletin H-1200-B36. 6 pages. Worthington Pump and Machinery Corporation, Harrison, N. J.

ELECTRIC HEAT IN INDUSTRY. 7 pages. General Electric, Schenectady, N. Y.

MANUAL OF EMPLOYMENT INTERVIEWING; THE CHARACTERISTICS OF SALARY GRADES: TRAINING AND CO-ORDINATION IN THE OFFICE; ADMINISTERING THE OFFICE UNION CONTRACT; INCENTIVES AND WORK STANDARDS IN THE OFFICE; STREAMLINING OFFICE METHODS AND LAYOUTS. American Management Association, 330 W. 42nd Street, New York 18, N. Y.

CEDAR RAPIDS MAINTENANCE AND OPERATION HANDBOOK FOR BELT CONVEYORS. Bulletin BC-2. 24 pages. Iowa Manufacturing Company, Cedar Rapids, Ia.

TRUCK & TRAILER SIZE AND WEIGHT RESTRICTIONS, 1947. 51 pages. First reprint of the revised restrictions pamphlet since January, 1940, when federal regulations superseded state regulations to facilitate movement of war materials. Offered to truckers as a service of The Four Wheel Drive Auto Company since 1933. Available to all interested truckers. The Four Wheel Drive Auto Co., Clintonville, Wis.

1946 CANADIAN MINES HANDBOOK, *15th annual edition. 404 pages. Published by the Northern Miner Press Limited, Toronto, Canada. Price, $2.00.*

This manual lists 1,765 mining companies in operation throughout Canada, giving details of their production, earnings, dividends and other essential information.

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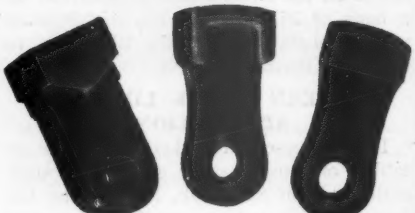

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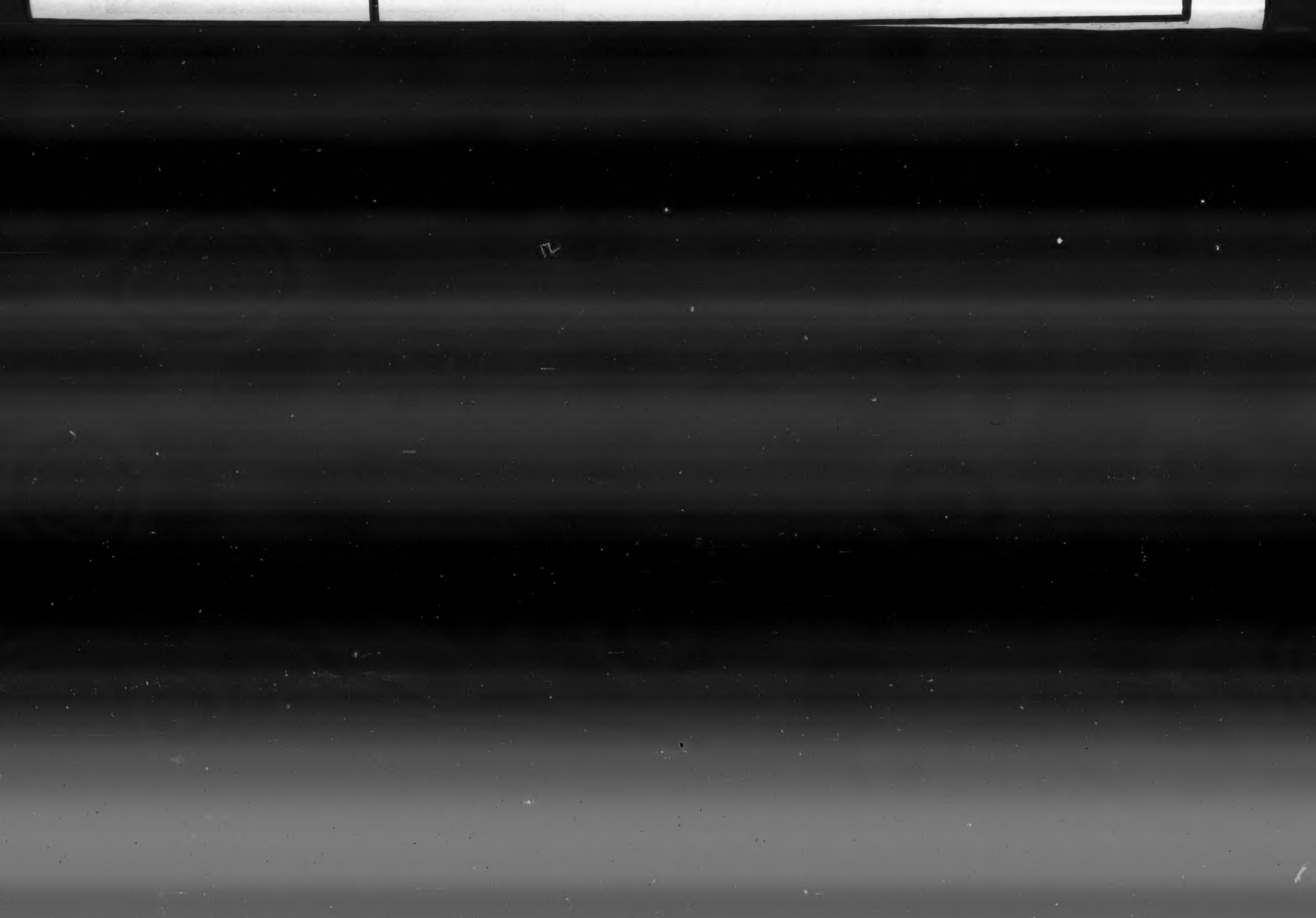

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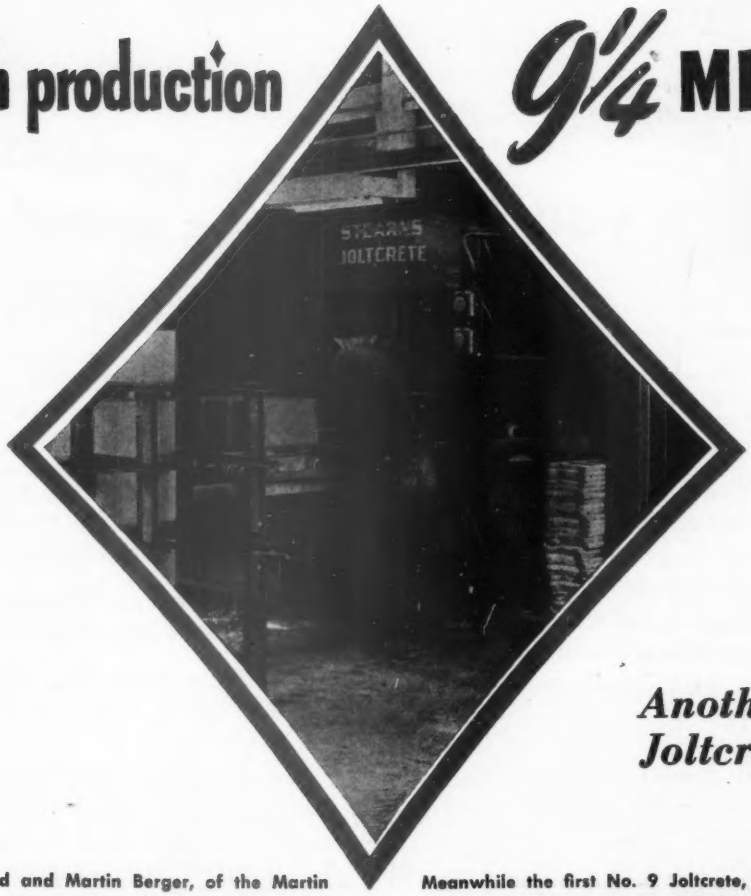

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Eight years ago, Raymond and Martin Berger, of the Martin Berger Cement Block Company, Detroit, Michigan, installed their first STEARNS No. 9 JOLTCRETE. It has operated steadily and dependably ever since, producing over a million block each year.

Their business has grown every year too. Now another No. 9 Joltcrete stands beside the Ace Performer, pictured above. A third brother, Clarence, has joined the firm. Their new plant (all STEARNS—equipped) is now under construction north of Detroit.

Meanwhile the first No. 9 Joltcrete, going strong into its 9th year, keeps right on making block, day after day. In all that time, the maintenance cost, including parts and labor, has been less than 1/16 cent per block.

Many satisfied Joltcrete owners report similar growth and profit, resulting from the efficient, high production, low cost operation of Stearns Joltcretes. Write to us for full description.

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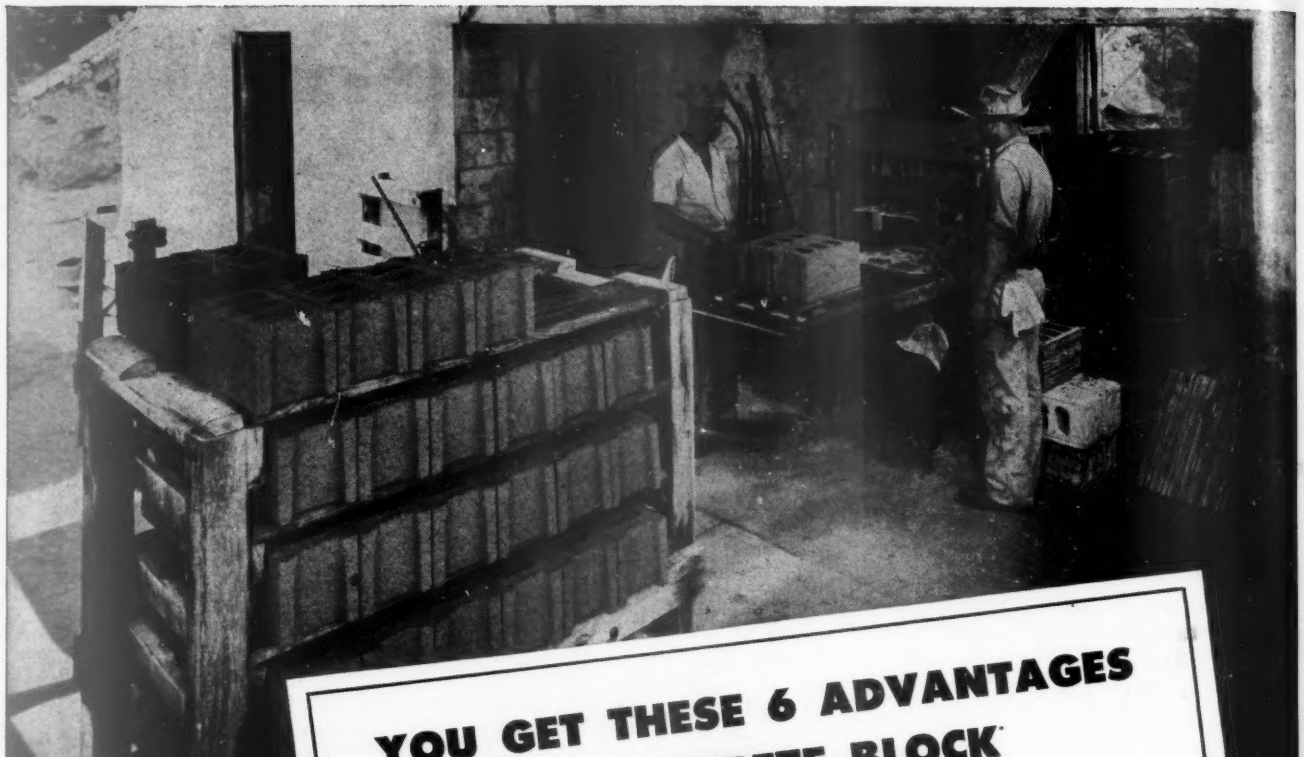

Duraplastic block, Greenville (S.C.) Concrete Co.

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Experience shows that Atlas Duraplastic air-entraining cement makes superior concrete block at no extra cost.

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1. **Generally improved appearance,** more exact edges and corners, truer dimensions, improved face texture.
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Atlas Duraplastic complies with ASTM and Federal specifications and sells at the same price as regular cement. Send for further information. Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

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Its 100 pages are profusely illustrated and literally filled with all kinds of down-to-earth, ready-to-use, practical facts, data, methods, procedures, suggestions, and ideas —actually a concise combination of the "know how" of the keenest brains in all phases of the concrete industries.

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Regardless of whether you've been in the concrete business for 30 years . . . or . . . plan to enter it tomorrow—it will certainly pay you and every key man in your organization to own a copy of the 1947 Edition of the CONCRETE INDUSTRIES YEARBOOK. Advance orders already indicate that the big, new, 1947 Edition will be sold out in a hurry.

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NEWS OF CONCRETE MANUFACTURERS

N.C.M.A. Members Urged To Support Bricklayers' Apprentice Training

The National Concrete Masonry Association has gone on record as giving enthusiastic support to the program currently sponsored by the Apprentice Training Service, U. S. Department of Labor. This work, ably outlined by Maurice M. Hanson, assistant director, at the recent annual meeting of the N.C.M.A., was undertaken for the training of bricklayers.

Association members are urged to become acquainted with those on joint committees of the unions and employers' groups in their respective communities. They may cooperate with members of these committees by furnishing literature and supplying necessary materials for constructing practice walls.

Carter-Waters Corp. Erects New Plant at New Market, Mo.

At New Market, Mo., construction of a $300,000 Haydite plant has been started by the Carter-Waters Corporation. A. R. Waters, president, has stated that the plant is expected to be in operation by this fall.

Originally the facilities were to be located at the edge of Kansas City, Mo., but because of objections of residents the site was changed to a point 35 miles north of the city. Here the firm acquired 65 acres of land containing millions of tons of the shale used for the production of Haydite.

The new plant, according to A. W. Baldwin, Carter-Waters engineer, will have a capacity of ten carloads of Haydite aggregate per day.

Historically, Haydite was developed and patented by Steven J. Hayde more than 25 years ago in Kansas City. Several years ago the Carter-Waters interests took over the Hayde plant. A second unit will be built in or near Kansas City after the completion of the plant at New Market.

Yoder Company Takes Lead In Cutting Machinery Costs

The Yoder Company of Cleveland, O., makers of a compression testing machine for concrete blocks, recently announced that most of its quotations would be cut. Technically, the slash will be effected by dropping the escalator clause from prices quoted for certain items; consequently, prices will be "firm," not subject to readjustment after contracts have been made.

Escalator clauses have been employed in post-war industrial deals to provide for an increase in price if material costs rise after the signing of a contract. L. C. Lucas, president of the Yoder firm, which employs 500 workers, said that he believed the top of the price curve had probably been reached.

A newly-installed batching plant at the Builder's Supply Company in Portland, Ore., measures tons of materials used in concrete mixtures to within one pound. John Ash is the founder of the firm.

• A view of the Arizona Sand & Rock Company's new ready-mixed concrete plant, near Phoenix, and its fleet of transit-mix trucks. The plant was completed in August, 1946. Al Carter, plant superintendent, is in charge.

Steingart Named General Director of Elliott System At Birmingham, Ala.

Harry A. Steingart, industrial and productions engineer for the government during World War II, has moved to Birmingham, Ala., to become general director of the Elliott System, manufacturers of prefabricated concrete homes.

Mr. Steingart served as supervising engineer for the Alexandria Housing Authority, in charge of government-sponsored prefabricated housing experiments. During the war he was sent to Mobile, Ala., to supervise and expediate site and mill fabrication methods for homes of war workers in that area.

Bric-Block Company Builds New Facilities at Nashua, Ia.

A new type of concrete block is currently being produced at the plant of the North Iowa Bric-Block Company at Nashua, Ia. Full capacity is expected to be 9,600 units per day.

The block, 18 by 8 by 8 inches in size, is obtainable in plain, multicolor or any combination of colors and has the appearance of brick. Jerome Bloom of Minneapolis was the originator of the block. Others associated with him are John R. Cronin and R. J. Bennett, both of Nashua. The plant in that city is the second to be built, the parent plant being located in Minneapolis. It is proposed to build a third unit in northwestern Iowa and others in southern Minnesota and Wisconsin.

Expanded Obsidian Product Makes New Building Material

Now being produced in limited quantities by Continental Basic Materials Corp., San Diego, Calif., is a new type construction material known as "CBM." It is produced from thermally expanded high-purity obsidian similar to perlite but with little or no moisture content. It has five sizes, ranging from a white powder to fluffy white granules 0.75 inch in diameter.

This material when mixed with cement in the proper proportions, is claimed to have 2.5 times the strength of sand and cement and only one-third the weight.

California Rancher Enters Roof Tile Making Business

L. E. Putnam of Clements, Calif., who was originally a cattleman and a rancher, has recently added two new activities to his routine. From the deposits of high-quality sand on his ranch, he obtains the material which, with cement and paint, is used to make Bartile, a newly-developed roofing tile.

Mr. Putnam bought a tile machine, manufactured by the E. P. Barber Company of Bloomington, Calif., and soon found himself so swamped with orders that he offered to obtain equipment and teach potential competitors how to use it. He is also an employee of the Claude Wood Company's gravel pit, where a record production of aggregates for concrete work is currently reported.

Skilful Vets Beat Shortages By Ingenious Adaptations

Two World War II veterans, Raymond W. Maney and Harvey B. Schoonmaker, have begun producing concrete and cinder blocks under the company name of the Goshen Block Company at Goshen, Pa.

The critical shortage of equipment has prodded these two men into making unique improvisations with available machinery. A converted small dump truck gives the firm a vehicle for carrying the blocks to and from the drying rooms. The hydraulic dump body lift was changed into a pallet lift for moving the loaded drying racks. Necessity made the mixer a model of the owner's design and manufacture. Since it was impossible to secure the proper electrical power for the plant, the partners rigged up a jeep-type engine to turn the mixer.

Numerous other ingenious adaptations were made to compensate for missing facilities which could not be secured. The firm members also built their own plant building from their cinder blocks.

New Oregon Firm to Produce Concrete Blocks and Bricks

A new industry at Oceanlake, Ore., is that of the Oceanlake Brick & Tile Company, which is currently building a plant. Production is expected to start in the near future. A daily capacity of 2,000 concrete blocks and 8,000 concrete bricks has been set as the initial objective.

Organizers of the $10,000 firm are H. S. Rood, Z. K. Smith, Leo Denzil and William Love.

Indiana Concrete Concern Begins Production of Blocks

Masonry Products, Inc., of Columbia City, Ind., reports that production has begun at its new plant at the rate of 4,000 concrete blocks per day. Officials state that a concrete brick machine already is installed and that the firm will soon be putting out the smaller units also, these at the rate of 2,000 each hour.

The officers of the new concern are Edwin Heupel, president, and L. A. Mason, secretary-treasurer. John Chapman is plant manager.

Ernest Seaman, aged 53 years, who was the proprietor of a concrete burial vault business in Sandusky, O., since 1924, died at his home on March 17.

A $301,842 contract for the manufacture and laying of concrete pipe in the new municipal water distribution system at Provo, Utah, has been awarded the Utah-Idaho Concrete Pipe Company of Provo.

Labor Leader Requests Locals to Participate In Training Program

Harry C. Bates, president of the Bricklayers, Masons and Plasterers International Union of America, in a recent communication to all subordinate unions urged these locals to establish and maintain joint apprenticeship committees for the support of the Apprentice-Training Service.

He stated that there were 250 joint apprenticeship committees in active operation throughout the United States, all of which were established in accordance with the principles incorporated in the National Bricklaying Apprenticeship Standards. President Bates indicated that his union is 100 percent behind the promotion of these standards.

Basalt Rock Executives Get Exclusive Rocklite Rights

A new organization known as the Management and Superintendent Group of Basalt Rock Company was recently formed by A. G. Streblow, president of the Basalt Rock Co., Napa, Calif., and other company executives. The group will have exclusive rights to employ Rocklite, a lightweight aggregate, for the manufacture of precast concrete products in Southern California. Construction of a plant in Ventura, Calif., is contemplated by the members of the new organization.

W. J. Pyne Joins Graystone Staff as Sales Engineer

The appointment of William J. Pyne to the sales engineering staff of the Graystone Concrete Products Company of Seattle, Wash., was recently announced by F. M. Kettenring, president.

Mr. Pyne served during the recent hostilities as project engineer with the U. S. Army Air Forces. He has also served on the Pratt & Whitney Aircraft Corporation staff as field representative in the United States and abroad.

Campbell Corp. Obtains Sakrete License Extension

Sakrete Incorporated of Cincinnati, O., has extended the license of Harry T. Campbell Sons Corporation, Baltimore, Md., to manufacture Sakrete, a dry-mix concrete, in New York, Connecticut, Rhode Island, Pennsylvania, New Jersey, Virginia and Florida. At least one plant is to be put in operation in each of these states. Sakrete is now available in 21 states.

Ramsey Bonewitz has been appointed manager of the Huntington Concrete Products, Inc., Huntington, Ind. He succeeds William Pleanietz, who is retiring from the business. Plans are being made to double the present plant output. Among the new products which the company expects to add to its present line is a concrete beam with a wooden insert.

MEN OF THE INDUSTRY—HERBERT F. GEIST

President of Cleveland Block Concern Heads A Progressive Industry

HERBERT Frederick Geist was born on October 6, 1887, on Cleveland's West Side. His parents, Herman and Caroline, were of German descent, as were perhaps three-fourths of the people then living in that area. The oldest of a family of four children, he early assumed many of the burdens of the world. He still carries them, not with the spirit of the resigned pessimist, but rather with a dry humor.

He went through Denison Grammar School with the reputation of being the unsmilingest kid that ever attended the school before or since, and went on to Lincoln High School, called prophetically by Cleveland sports writers the school of the Presidents.

The Geist family at this time included also two brothers, Irving and Elmer, and a sister Mildred. The family home, a big, rambling house peculiar to the architecture of the 90's was set on a plot too small to be called a farm, and too big to be considered merely a garden. Herman Geist had started at about the turn of the century the development of this land into a subdivision. A street was cut through, and he began to build houses for sale. It was at this time that he discovered, under the layer of top soil, a deep drift of sand suitable for the making of concrete blocks. This sand stratum had a profound effect on the life and fortunes of Herb and the rest of the Geist family. Herman, with not unexpected perspicacity, had made the most of his find and began to build the house foundations out of blocks made with his own sand.

By the time he was in his teens, young Herb was helping with these matters and it was this early in life that he decided to make with the brains instead of with the hands. It was easier and didn't raise so many blisters. Since those early years, he and his brothers have been close to the building business and to the block industry, no strangers to the hammer and saw, the paint brush or the mason's trowel.

After his graduation from high school Herb entered Ohio Wesleyan University, at Delaware, Ohio. Although a good student, he gained no outstanding honors scholastically nor in athletics and left after one year to go to work. He is a member of Phi Delta Theta fraternity.

His mind had been sharpened and his muscles seriously softened by a year of higher education, and he followed through on his decision that the efforts of his brain would be more rewarding than the sweat of his brow. In 1909 he organized The Geist Cement Products Company and became its first president, with the experience of his father and the good will and ambition of all of the family behind him.

Herbert F. Geist

From this time forward it is difficult to disassociate the personal affairs of Herb Geist from those of his company. For many years it has been his living, his hobby and his avocation, all rolled into one.

By 1918 the Geist company was making blocks at a great rate, for those days. It had taken on various lines of merchandise and branched into the building materials business. By this time, too, the brothers and sister had taken over many duties.

In 1919 Herb organized and became president of The Independent Brick and Tile Company. This organization, created to manufacture a large outqut of high-quality building tile and face brick cut a swath among Cleveland builders and contractors during the lush 20's. Came 1929 however, and 1930, and the brick and tile plant, with many groanings hit the toboggan and slid into oblivion, carrying Herb's and the rest of the family's fortunes with it, leaving only the original, smaller company. From 1929 through the middle 30's Herb was still head of the company, which had practically no business and no capital. By 1935 things picked up a bit and the company began to show some stirrings of life.

During the 20's and into the 30's the concrete block business was in the doldrums. The company had allowed the block plant to depreciate and deteriorate, having expended all of its capital and much of its energy in the brick and tile plant.

In 1940, Herb decided to go back into the block business. The old plant was remodeled and a Besser Super Vibrapac installed, with all the strain that the purse strings and the available lines of credit would bear. The going was tough, but after the first hump was over Herb spurred the organization to attainments in the manufacture and merchandising of blocks and laid the groundwork for future expansion. At this time he took into the company, Harold and Robert Geist, brothers to each other and cousins to the Geists.

It was during this period that new methods were adopted in the block plant. The use of fork lift trucks as part of the manufacturing operation; the cubing of blocks to reduce manual operations; the trademarking of blocks; the development of 'round-the-clock operation—all these were either originated or developed at the Geist plant.

The past several years have seen Herb somewhat freed from much of the work he did. As the company grew and its business expanded, he passed on many duties to able lieutenants and has developed and revived other interests. In golf, for example, he has lifted himself out of the dub class on the course itself and may easily be classified as an expert at the 19th hole. He is a member of the Westwood Country Club and of the Cleveland Athletic Club, where he gets much of his winter exercise in bowling. He is a regular follower of the symphony, the opera and the theatre, and carries his love of music into his home, where he entertains his guests with his library of symphonic records.

First impressions of Herb Geist are of his reserve and solemnity, combined with a deep sense of humor. Later you realize that he has a passion for perfection. Early this year an upsurge of youth, helped perhaps by the example of

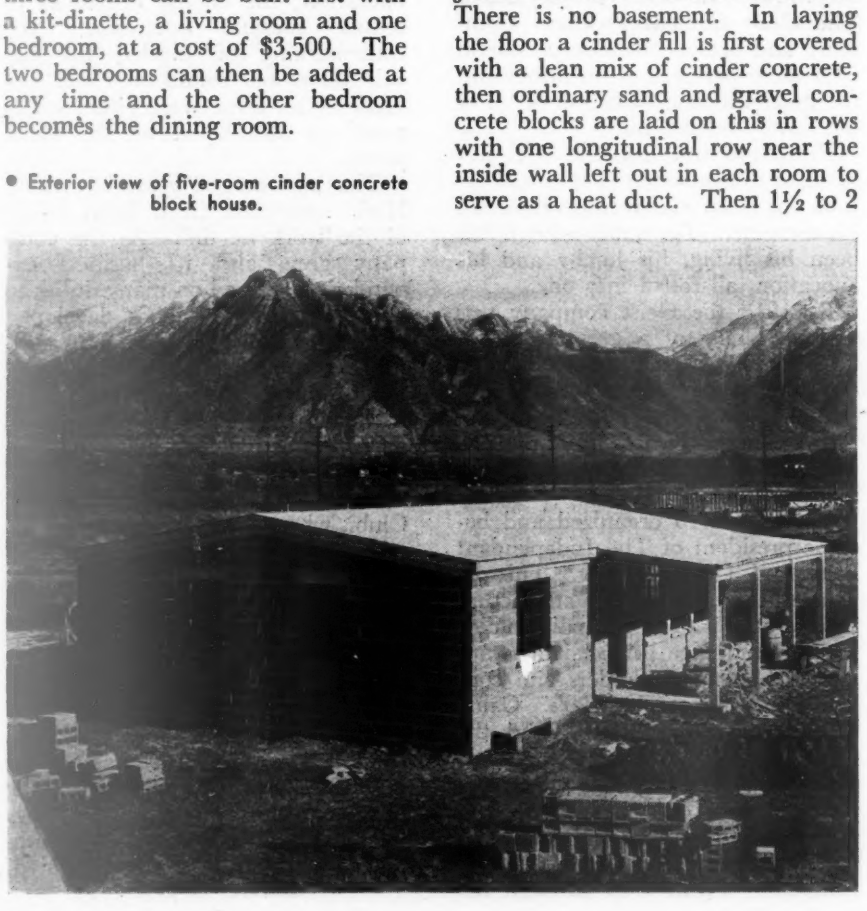
(*Continued on page* 110)

Low-Cost Block Houses with Radiant Heating Built in Salt Lake City Area

IN Salt Lake City, Utah, as well as any other city in this country, more or less successful efforts are being made to provide low-cost housing for veterans and others in spite of the increased cost of construction. In a personally-conducted campaign Willard "Wid" Ashton, office manager of Otto Buehner & Co., Salt Lake City, purchased a piece of property near the city and developed a type of house to go on it. From 10 to 20 houses will be built on this property, depending on the demand, and these will be located on a dead-end street with a turn-around. Two houses have already been completed and others are under construction. In order to get low cost everything is eliminated except necessities but neither appearance nor comfort has been sacrificed. One man already has made further savings by building his own house.

The complete 5-room house is designed to sell for $5,000 exclusive of land and includes radiant heat, refrigeration, lights, etc. If desired three rooms can be built first with a kit-dinette, a living room and one bedroom, at a cost of $3,500. The two bedrooms can then be added at any time and the other bedroom becomes the dining room.

• Exterior view of five-room cinder concrete block house.



• A view showing the method of installing radiant heating system.

The houses are built entirely of cinder concrete blocks with concrete sills and lintels, steel sash, and Johns-Manville Cemestoboard roof. There is no basement. In laying the floor a cinder fill is first covered with a lean mix of cinder concrete, then ordinary sand and gravel concrete blocks are laid on this in rows with one longitudinal row near the inside wall left out in each room to serve as a heat duct. Then 1½ to 2 inches of concrete is spread over the blocks and finished off for the floor.

A gas heating unit is being used but others would do as well. From the heater the ducts leading into the various rooms are controlled by individual dampers. The heat passes from these ducts through the many cross ducts formed by the cells of the blocks. At the far or exposed wall of each room there is a narrow inclined metal grill which lets the air out into the room with its temperature so reduced that no drafts are created but layer-cake heat is prevented.

Men of the Industry

(*From page* 109)

his carefree and joyous son, caused him to buy himself a convertible coupe wherein he took himself off for Florida, where he hoped to play golf and catch the sun. Instead, he got chilblains and a bad cold. Upon his return to Cleveland's ice and snow he promptly turned over the convertible to his son and forthwith purchased a car more in keeping with his temperament, his dignity and his constitution.

Herb had made a fortune by the time he was 30, and lost it at 40. Today he has all the requirements for a happy life—a successful business, a snug apartment and pleasant avocations.

New Anchor Concrete Products Plant Sets a Fast Pace for the Industry

• A general view of the new combined block and Flexicore slab plant of Anchor Concrete Products, Inc., at Buffalo, N. Y. The 24-in. belt conveyor at the left elevates aggregates to the 303-cu.-yd. bin.

another ON THE SPOT report

THE big news in the concrete masonry industry at this writing is the new plant of Anchor Concrete Products, Inc., of Buffalo, New York, which will be formally unveiled to the Niagara Frontier building industry at an invitational open house to be held on June 21st. Engineers, architects, masons, contractors and others who attend this affair will unquestionably see one of the finest and best designed plants that the booming concrete products industry has thus far produced—a plant which in our opinion will for some years constitute a goal for others in the industry to shoot at.

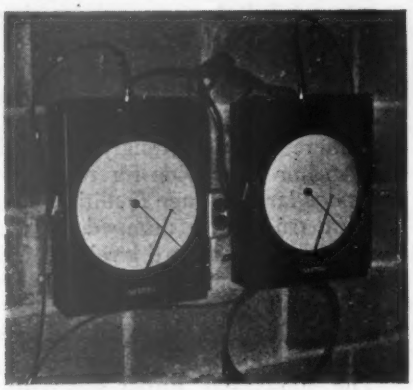
By WILLIAM M. AVERY

Representing a $350,000 vote of confidence in the future of the concrete products industry, the new plant is largely an outgrowth of the organizing genius and boundless energy of Fred W. Reinhold, president of the company and one of the founders and underwriters of the reorganized National Concrete Masonry Association. As a past president of that organization and a member of its board of directors for the past eight years, Mr. Reinhold told us recently that much of the progress and growth of his company has come about as a result of close participation in the many activities of the association.

Whatever the explanation, the company's growth has been truly remarkable. Mr. Reinhold organized Anchor Concrete Products, Inc. in March, 1936, culminating sixteen years in the block business, during which time he was associated with others as vice-president and production manager of a company which is no longer in existence. The new concern started operations with a single power stripper to which a second similar unit was added in 1937. A No. 9 Joltcrete was installed in 1940 and two years later a Vibrapac machine was placed in operation. In June, 1940, the company was licensed to manufacture Flexicore precast concrete slabs and a separate 24-mold plant was developed on a site located at 1026 Niagara Street in Buffalo, New York.

The rapid expansion of the company's block operations had by 1942 crowded the original plant site at 1375 William Street, and it was recognized that any further development of this location was certain

• Right: Fred W. Reinhold, founder and president of the Anchor company, for whom the new plant culminates 27 years of active participation in the concrete block industry. • Below, left: These recording temperature controls keep an accurate record of kiln conditions throughout the curing cycle. • Below, right: One of the fans which are mounted above the aisle between the kilns; they are used to force hot air into the curing rooms during the drying cycle.



• Left: The four mixers, located on the mezzanine floor above the block machines, are supplied by traveling weigh batchers. The fourth mixer (at the far end of the room) supplies concrete to the Flexicore plant.

• Below: A view of the block machine room, showing the liberal space provision around each of the three production units. These machines are producing more than 16,000 standard units per 8-hr. day.

to impair operating efficiency. Furthermore, there were obvious economical advantages to be gained by integrating block and slab production within a single plant. To gain these advantages, as well as to provide adequate space for any future expansions of operations, the new plant has been located on a 9-acre Lehigh Valley railway siding on the outskirts of Buffalo.

Material Handling Aggregates can be fed to the new plant from railway cars or trucks, a foresighted provision which has proved to be of infinite value during the shortage of railway cars. Actually this dual delivery system was adopted in order to avoid the car demurrage expense and delay which are almost inevitably incurred with rail deliveries during freezing weather. Truck deliveries, of aggregate, which predominate during the winter months, are reduced to a mere auxiliary function during the summer.

The entire layout of facilities for handling aggregates was engineered by Kenneth Kehr of the Butler Bin Co. Since the plant, operating on a single-shift basis, consumes about 400 tons of aggregates per day, it was recognized that the utmost dependability must be achieved with the equipment which feeds the bins. Complete accessibility for inspection and maintenance was conceived to be especially desirable, and for this reason (more than any other) belt conveyors were adopted instead of the more conventional bucket elevators.

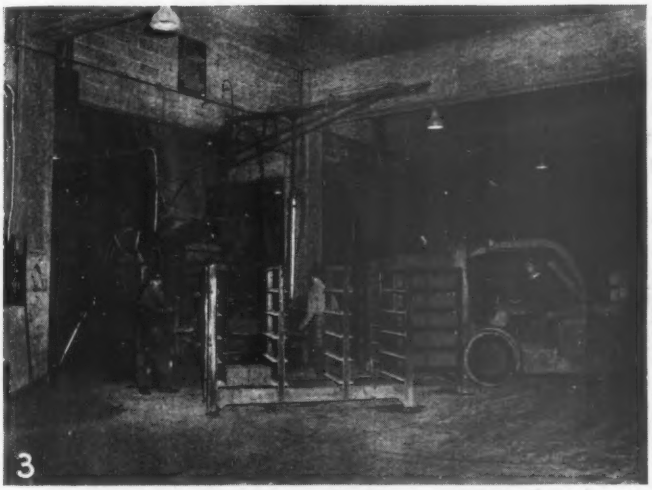
Both the truck and the rail hoppers, which stand side by side, feed onto a 24-inch Barber Greene inclined belt conveyor. Covered with crowned corrugated steel sheets for protection from the weather, the conveyor rises to a steel tower opposite the bins, where a selector (operated from the ground) may divert the flow into a cinder processing plant which will soon be installed adjacent to the tower. At present the entire flow goes onto a second section of belt conveyor connecting the tower with the top of the bins.

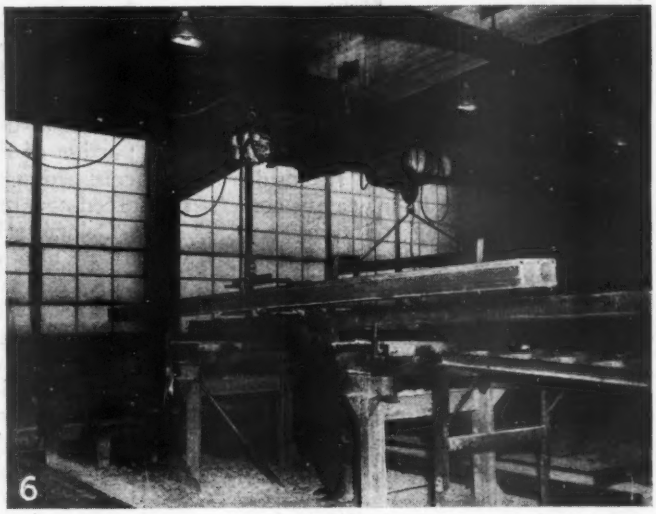
Since there are three cement mills located in Buffalo, truck deliveries are obtainable on an hour's notice, and there was accordingly no need for Anchor to provide for rail shipments or large storage facilities. The cement trucks are dumped into a covered hopper at yard level and the material is fed to the bin by means of a bucket elevator. Anchor uses air-entraining cement exclusively in all its operations.

The 303-cu.-yd. Butler bin is divided into six compartments, enabling the plant to batch out three different types of aggregate simultaneously; *i.e.* sand and gravel for Flexicore production and Celocrete and cinders for block production. One compartment of the bin is used for the storage of 175 bbls. of cement. Aggregate consumption runs about 60 percent Celocrete, 30 percent cinders and 10 percent sand and gravel.

Batching and Mixing Two batchers, a 50-cu-ft. power-driven unit and a smaller hand-powered machine, operate on rails located just under the bin. Normally the power-driven batcher is used to feed the three 50-cu.-ft. Besser batch mixers which supply the block machines. The smaller unit batches into a 40-cu.-ft. mixer which furnishes sand and gravel concrete to the Flexicor plant.

The mixing room is a mezzanine floor installation, giving complete gravity flow of materials from the bin down to the block machines on





1. A view of the 178-hp. coal-fired low-pressure boiler, which supplies steam for curing and drying and for space heating the plant.

2. One of the company's four 7,500-lb.-capacity lift trucks with a loaded rack about to go into the kiln at the right. The rack holds 108 standard units; it is the largest used in the industry at present.

3. Two of the block machines in operation. Note the mill-type reinforced concrete frame of this portion of the building. The curtain walls are constructed of 12-in. Celocrete block.

4. A general view of the Flexicore plant. The kiln is in the background, the transverse conveyor in the foreground and the assembly conveyor at the right.

5. Filling one of the Flexicore molds with concrete. The mold rests on three vibrating piers.

6. A freshly-stripped Flexicore slab comes off the production line. This plant is designed to produce 150 units in an 8-hr. day.

the ground floor. Particularly notable are the excellent light and complete accessibility of the mixers from all sides. The room is approximately 90 ft. long and 25 ft. wide. Also located on the mixing floor level is a 250-gallon hot water tank which is heated by a steam line from the boiler plant. Hot water, averaging about 180 degrees F., is used the year around for mixing.

Machine Floor The three Besser Super Vibrapacs are located almost directly below the mixers, from which they are fed through steel hopper chutes. Set on 24-ft. centers, the backs of the machines stand a full 15 ft. clear of the wall in order to give adequate room for loading the pallet magazines. The layout of the block machine floor posed special clearance problems because of the company's use of 108-unit racks which are the largest in the industry at present. In addition to the generous clearance allowed at the rear of the machines, there is a clear space in front of about 35 ft. running the full 90 ft. length of the room.

The outsize racks, which are loaded 6 units high, were adopted for two reasons: to reduce needless wear and tear on the lift trucks and to facilitate cubing operations with which the company is now experimenting. A single rack, containing 108 8-in. units, make up an exact 4-ft. cube. The cubes are handled by engaging the cores of the bottom tier of blocks with the 6 forks of the lift trucks.

Curing The four curing kilns are reached from a 24-ft. aisle which leads from one end of the block machine room, with two kilns grouped on each side of the aisle. They measure 18 by 69 ft. inside. Exterior walls are 12-in. cavity construction, consisting of 6-in. and 4-in. Celocrete block with a 2-in. cavity filled with foam glass insulating block. The roofs are built of Flexicore slabs, with 2 in. of foam glass insulation covered by 4-ply asphalt roofing. The kilns are open on the aisle end only, and are sealed off during the curing cycle with tight-fitting rolling steel doors.

Each kiln holds 38 racks, or 4,104 8-in. equivalents per kiln. With three block machines in operation, loading is completed in 8 hours. The company is still experimenting with various cycles of curing and drying with the ultimate view of establishing a 24-hr. cycle which will bring the block within the A. S. T. M. moisture specification. At the moment the cycle breaks down roughly into 12 hrs. of steaming followed by 12 hrs. of drying, less charging and discharging time.

In the steaming portion of the cycle the temperature is built up to 180 degrees F. with live steam and held at that level for about 9 hrs. This is followed by a 2-hr. soaking period before the drying cycle commences. The 180-degree temperature is maintained during the drying period with hot air blasted into each kiln by a Buffalo Forge fan. The air is heated with high-temperature Modine steam-coil heaters and introduced into the kilns through lead-lined sheet metal ducts above the roofs. To conserve heat, during a portion of the drying cycle recirculating ducts return the air from the kilns back to the fans. Thermostatic controls on the steaming cycle and Powers recording temperature controls on the drying cycle assure accurate maintenance of desired temperature throughout the curing period.

Steam Plant Steam for curing and for space heating of the plant is furnished by a 178-hp. low-pressure Farrar & Trefts coal-fired boiler. Both the boiler room and the 4-ft. diameter by 90-ft. high masonry stack were designed for later installation of a second boiler. The boiler is fired with air from an Iron Fireman stoker. Steam pressure is automatically maintained within the limits of 8 and 15 lbs.

Building Design In the design and layout of the plant building Mr. Reinhold has provided Anchor's customers with an excellent example of both the utility and the eye appeal of precast and monolithic concrete used in combination. The portion of the plant devoted to Flexicore production is a rigid-frame reinforced-concrete structure with 12-in. Celocrete block curtain walls, which are also used in connection with the mill-type reinforced-concrete frame of the block plant. All roofs are spanned with Flexicore slabs covered with 4-ply asphalt roofing, and a 6-in. reinforced-concrete machine-trowelled floor covers the entire roofed area. In all, the floor areas comprises about 25,000 sq. ft., divided roughly into 15,000 sq. ft. of space for block production and 10,000 sq. ft. for the manufacture of Flexicore units.

For maximum efficiency and convenience, auxiliary facilities have been grouped around the block machine room, which is the center of activity in the plant. The machine shop, a tile-lined shower and locker room and the superintendent's office flank one long wall of the room, the latter so situated that the superintendent has a full view of both block and Flexicore production. A portion of the machine shop has been partitioned off for temporary office space, but foundations have already been poured for a separate 1,500-sq.-ft. building to house all sales, engineering and office personnel.

Yard Storage Approximately 3-acres of the ground adjacent to the building have been paved with slag-bound macadam to provide adequate storage for both blocks and slabs. With this large storage area wide aisles can be left between block piles to provide easy truck access to all points in the yard. Although the company operates two flat bed trucks of its own, practically all deliveries are contracted. By maintaining two-shift operations throughout most of the past winter, Anchor has built up a large stockpile of units, and now is in a position to make immediate delivery on most orders. Flexicore units are cut to length, and Ashlar units and other block specials are scored on the yard with a Stone saw.

Flexicore Plant The Flexicore plant is in most respects a standard installation which closely resembles Corbetta Construction Company's Bronx plant recently described in these pages. The plant has a capacity of 150 molds per day, compared with the 24 molds per day which could be handled in the Niagara Street plant.

An assembly-line method of production keeps the molds in almost continuous motion throughout the operating day. Stripping, cleaning, oiling, assembly, core insertion, prestressing the reinforced steel and similar operations are carried out on conveyors which run the full length of the room. Cross conveyors carry the prepared molds to vibrating piers located next to a chute which is fed by the 40-cu.-ft. batch mixer on the mezzanine floor. After filling, rough trowelling and vibrating, the molds are stacked on wheel trucks and shoved into the steam kiln.

The slabs are steamed at 120 degrees F. for a 24-hour period. After 4 hrs. of curing the cores are reflated and withdrawn through doors in the side of the kiln. In this manner each core hose can be used twice in an 8-hour production cycle. To facilitate rapid loading with one of the company's four 7,500-lb. power lift trucks, the finished slabs are

(*Continued on page* 120)

Labor Requirements in Production And Distribution of Concrete Pipe

By ALFRED W. COLLIER AND CLYDE STONE
Bureau of Labor Statistics
U. S. Department of Labor

PIPES made of concrete have been in use since the time of the Romans. A system of concrete water pipes still in good condition was discovered in 1928 near Cologne, Germany, which had been installed by the Romans about the year 80 A.D. Modern use of the product, following the introduction of portland cement in the nineteenth century, has been expanded to include irrigation and drainage, highway and railway culverts, sewers, airport drainage and many related uses. The development of irrigation in the far west went hand in hand with the development of the concrete pipe industry and the development of our extensive highway and airport systems were largely dependent on concrete pipe culvert and drainage systems.

Today there are approximately 300 concrete pipe manufacturers in the country, 150 of which manufacture pipe exclusively. The remaining producers manufacture concrete products such as blocks, brick, etc., in addition to pipe. Most of these manufacturers are small and employ an average of 6 to 10 workers. A few large producers in the United States employ up to 200 men. These are principally multi-plant organizations which started temporary plants on job sites. Because of the extreme weight and bulk of the product, transportation is a major item of expense, and to move a plant to the construction site proved to be more economical than transporting finished pipe from distant established plants. When construction on the job was completed the plants continued operations to serve local needs.

The following approximate production figures were obtained from industry representatives:

	Tons
1942	4,000,000
1943	2,000,000
1944	741,000
1945 (estimated)	721,000
1946 (estimated)	705,000

The above figures indicate that the industry is currently in a depression. When normal business activity is low, concrete pipe consumption increases with the development of public construction programs. The low production this year, as compared with previous years, is also partially explained by the fact that residential construction is receiving preference in the construction industry and the uses of concrete pipe, except for small diameter drain tiles, are negligible in this field. However, because of extreme shortages in clay tile, and soil pipe for house sewer lines, some substitutions with concrete pipe have been made for these products. As a result, the number of units of pipe produced may increase but because of their size and weight, it will not have a marked effect upon tonnage.

Manufacturing Processes Concrete pipe is made of cement, sand, gravel or crushed stone, and water; materials which are local in nature throughout the United States. Made in sizes from 4 inches in diameter to 138 inches in diameter, in both plain and reinforced concrete, it can be designed to serve a variety of internal pressures and external loading conditions. These sizes and designs are made by a variety of means.

Small non-reinforced concrete pipe is often made by the "packerhead" method where a revolving vane throws the concrete against the outside form. Molding machines are in common use for the manufacture of pipe sizes up to 60 inches in diameter. Machines using mechanical tampers produce both reinforced and non-reinforced pipe by tamping the dry mixture into forms. Centrifugal concrete pipe is made by several patented methods. Poured pipe can be made in almost any size by using plain poured concrete and concrete poured and vibrated. Thus, in general, concrete pipe is made by one of the following methods: packerhead, tamped, poured, poured and vibrated, and several varieties of the centrifugal method.

If reinforcing is used, a steel cage is built into the forms before the concrete is poured; this requires an additional operation in welding the reinforcing material into the desired diameter. As the size of the pipe increases, the thickness of the reinforcing steel becomes greater. Except for unusual specifications, reinforcing steel is not used in pipe sizes less than 30 inches in diameter. Almost universally, it is used in sizes over 36 inches. Reinforcing adds strength to the wall of the pipe and thereby makes an important reduction in the wall thicknesses necessary for the larger sizes.

A minor operation in concrete pipe production is the making of fittings and joints such as "Ys" and "T's." This is usually done by one man who fits the joints by hand.

Represented in this study are all sizes of concrete pipe, both plain and reinforced. Separate analysis for the various sizes and the plain and reinforced pipe was not considered feasible. Because of the range in sizes and the special purposes for which pipe may be used, the production equivalent is in net tons of product manufactured.

The analysis of 34 plants included in this study indicates that a total of 7.50 man-hours was required for the production of 1 ton of concrete pipe. It was estimated that 2.63 man-hours were required to extract, process, and deliver to the plant the necessary materials (including electric power) for the production of 1 ton of concrete pipe. Plant operations accounted for 4.40 man-hours per ton and the transportation of the finished product to the construction site required 0.47 man-hour. Estimated man-hour requirements, by operations, are presented in the following summary:

	Man-hours per Ton of Concrete Pipe
Raw materials, production and transportation	2.63
Manufacturing	4.40
Transportation, finished product	.47
Total, production and transportation	7.50

Man-hour requirements in the production of 1 ton of pipe varied inversely with the monthly rate of production. Plants producing 500 tons or less per month required 6.48 man-hours per ton, while the labor requirements per ton in plants producing more than 1,400 tons per month were 3.93 man-hours. Variations were noted among geographic areas with requirements ranging from 4.00 man-hours for plants in the Pacific States to 6.16 man-hours for plants in the Northeast.

Raw Materials The principal materials used in the manufacture of concrete pipe are (1) cement, (2) sand and gravel or crushed stone, and (3) reinforcing steel. Below are shown the materials, including electric power, and the man-hours required to produce the quantities consumed per ton of concrete pipe, for which data were estimated:

	Requirements per Ton	
	Amount of Materials	Man-hours to Produce Quantities Consumed[1]
Cement.....barrels	0.90	0.90
Sand and gravel.....tons	.85	.80
Reinforcing steel....tons	.02	.91
Electric power....kw.-hr.	6.03	.02
Total, per ton.....	.....	2.63

[1] Includes man-hour requirements for delivery to the plant.

On the basis of estimates developed in the previous section of this report on labor requirements in concrete-block production, the man-hours needed for the production and transportation of cement, sand and gravel, and electric power were determined.

An analysis, in 1935, of man-hours per unit of output in steel manufacture[1] did not prepare estimates for the manufacture of the type of steel used as reinforcing for pipe. However, in the absence of these data, the man-hour requirements for drawn wire were substituted. thus, it was estimated that 0.91 man-hours were required to produce and transport the average quantity of reinforcing steel used in the manufacture of 1 ton of concrete pipe. It should be noted that the 0.02 ton of steel represents an average requirement per ton for the production of all plain and reinforced pipe included in this study, and that the labor requirements estimate does not include the fabrication of this material into the steel fabric used for reinforcing.

Plant Operations Because the pipe plants included in the study manufactured a wide variety of sizes during the period surveyed, it was found feasible not to attempt to separate the manufacturing process in terms of man-hours for machine-molded and hand-cast pipe.

The following figures show the man-hours required to manufacture a ton of pipe, by plant operations. A total of 129,370 man-hours of labor was required to produce 29,402 tons of pipe, or 4.40 man-hours per ton.

	Man-hour Total	Requirements per Ton
Proportioning and mixing...	12,251	.42
Cage welders.....	7,484	.25
Molding (machine and cast).	13,017	.44
Trucking and stripping.....	17,847	.61
Yard.....	41,201	1.41
Maintenance.....	9,783	.33
Superintendent and foremen.	8,757	.30
Miscellaneous labor.....	2,492	.08
Administrative.....	16,538	.56
Total (34 plants).....	129,370	4.40

The proportioning and mixing operation is very similar to that for heavyweight block. The construction of the steel reinforcing cage, around which the concrete is poured for the larger sizes of pipe, comprises the cage welding operation.

The molding operation includes pouring concrete into forms, and vibrating or tamping.

After the pipe is formed or molded, the next operation is stripping the unit from the mold. For machine-molded pipe, this is done by mechanical strippers which remove the mold and allow the pipe to stand and harden. Then the unit is placed on carts or dollies and hauled to the curing rooms or kilns. In cast pipe the mold is removed by hand and made ready for wrapping and sprinkling.

Because pipe is bulky and heavy, considerable yard labor is necessary to move the pipe from the molding forms to curing places about the plant. After curing, the pipe is prepared for shipment. In cast pipe plants, yard men assist in stripping the mold and wrapping the pipe. This operation accounted for nearly a third of all labor in the plant and required a total of 41,201 man-hours, or 1.41 hours per ton of concrete pipe.

The overhead operations (maintenance, superintendents and foremen, and miscellaneous labor) and administrative labor are similar to those for block plants.

Transporting Pipe Conditions similar to those noted in the transportation of concrete block prevail in the delivery of concrete pipe to the construction site and for the same reasons, these data are not included in plant operations. Data for plants which delivered their product show that the transportation of 17,333 tons of concrete pipe required 8,071 man-hours, an average of 0.47 man-hour per ton.

Table 4 indicates the variations in man-hours per ton of pipe production on a monthly tonnage basis of 29 plants included in the survey. Considerable variation was noted between those plants which produced 1,400 tons and over (3.93 man-hours for each ton of pipe produced), and those producing less than 500 tons per month (6.48 man-hours). The total man-hours are divided between manufacturing, yard, overhead, and administrative operations.[1]

Variations in labor requirements per ton of pipe by geographic areas are given in table 5. Total man-hour requirements per ton range from 4.00 for Pacific plants to 6.16 for the Northeast. It is not to be concluded that these variations assume significance because of the geographic location of the plants. The comparatively high averages shown for the Northeast appear to be largely due to the low percentage of ca-

(*Continued on page* 120)

TABLE 4.—Average Number of Man-Hours Required to Produce 1 Ton of Concrete Pipe,[1] 1946, by Rate of Production

Rate of Production	Number of Plants	Man-hours per Ton				
		Total	Manufacturing	Yard	Overhead	Administrative
All plants.....	29	4.55	1.73	1.50	0.73	0.59
Under 500 tons.....	8	6.48	2.18	2.22	.87	1.21
500-799 tons.....	8	4.77	1.82	1.35	.90	.70
800-1,099 tons.....	5	4.34	1.93	.95	.85	.61
1,100-1,399 tons.....	5	4.24	1.57	1.62	.63	.42
1,400 tons and over.....	3	3.93	1.40	1.72	.47	.34

[1] Does not include transportation of finished product.

TABLE 5.—Average Number of Man-Hours Required to Produce 1 Ton of Concrete Pipe,[1] 1946, by Geographic Division

Area	Number of Plants	Man-hours per Ton				
		Total	Manufacturing	Yard	Overhead	Administrative
All plants.....	34	4.40	1.72	1.41	0.71	0.56
Pacific.....	6	4.00	2.13	.68	.75	.44
East North Central.....	10	4.01	1.40	1.44	.61	.56
Middle Atlantic.....	8	4.20	1.12	1.91	.51	.66
West North Central.....	3	4.34	1.81	1.35	.79	.39
South.....	4	4.74	2.30	1.29	.72	.43
Northeast.....	3	6.16	2.56	1.34	1.39	.87

[1] Does not include transportation of finished product.

New California Plant Supplies Pipe for Central Valley Irrigation

By HARRY F. UTLEY

another ON THE SPOT report

A NEW plant producing concrete pipe, principally for irrigation, recently went into operation near Fresno, Calif. Known as the Fresno Concrete Pipe Co., it is located just south of the city on State Highway No. 41.

The plant is owned and operated by the Black-Church Corp., consisting of two gentlemen who know their way around in California concrete-pipe circles. Glenn N. Black has been connected with the production end of the industry for 18 years, the last 12 as superintendent at the Woodland and Perkins plants of the United Concrete Pipe Corp. Earl L. Church, the other partner, is an irrigation specialist having served for 13 years as field sales engineer in California and Arizona for the Snow Irrigation Supply Co. of Los Angeles. The new concern was the culmination of the joint conviction of Messrs. Black and Church that a real opportunity existed for the quality production and efficient laying of concrete irrigation piping among the ranchers of California's rich Central Valley.

Operations began September 6, 1946 and the concern already has a large backlog of unfilled orders.

Production at present consists of 8- to 36-in. plain pipe produced on a highly-efficient machine known as the Pease Tampmaster, the first of its type to be installed. The machine operates automatically in pre-controlled sequence, including the starting and stopping of the flow of concrete into the mold, at the touch of a button. Pressure on the tamp stick is maintained uniformly by a hydraulic cylinder as the mold is filled, assuring uniform compaction.

The plant structure covers an area of 40- by 90-ft., the entire floor area being paved with concrete. The mixer, below floor level, is charged manually. Aggregates, trucked, in, consist of ½- and ⅜-in. gravel and sand. Regular Portland cement is used but the mix is improved by the addition of Darex AEA in the proportions of 1 part Darex to 3 parts water, a 12-oz. tumblerful of the solution being added to each 12-cu.-ft. batch of concrete. Advantages of using the admixture, according to Mr. Black are: improved workability, higher ultimate strengths, and cleaner

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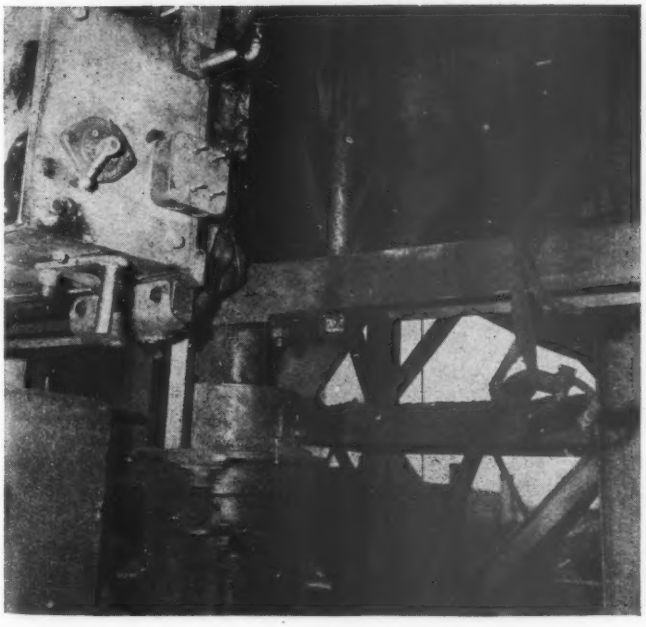
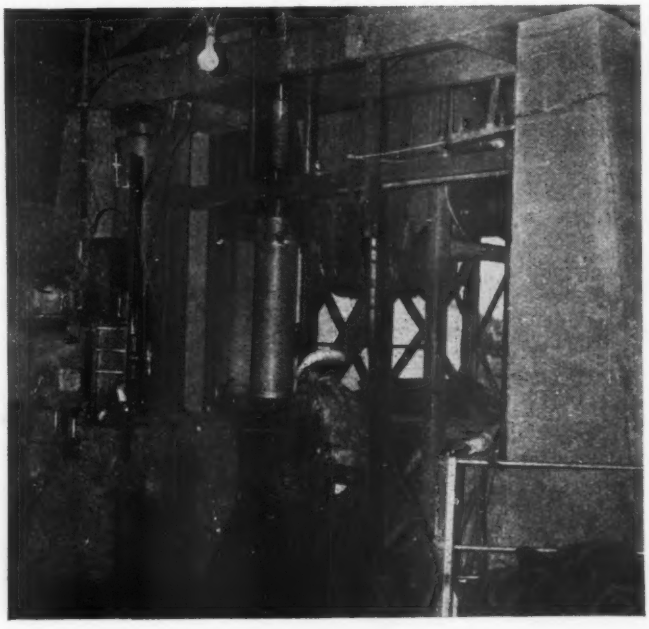




• Top row, left: Stripping freshly-made pipe sections at the Fresno Concrete Pipe Company's plant, Fresno, Calif. Right: Finished pipe being cured in the yard under a network of spray pipes.

• Lower row, left: A closeup view showing concrete feeding from the hopper to the pipe form. Right: A front view of the automatic pipe machine, which makes from 900 to 1,100 lineal feet of 10- and 12-in. pipe in an 8-hour run.

OWNERS' MECHANICAL SKILLS PAY OFF IN NEW CONCRETE PRODUCTS VENTURE

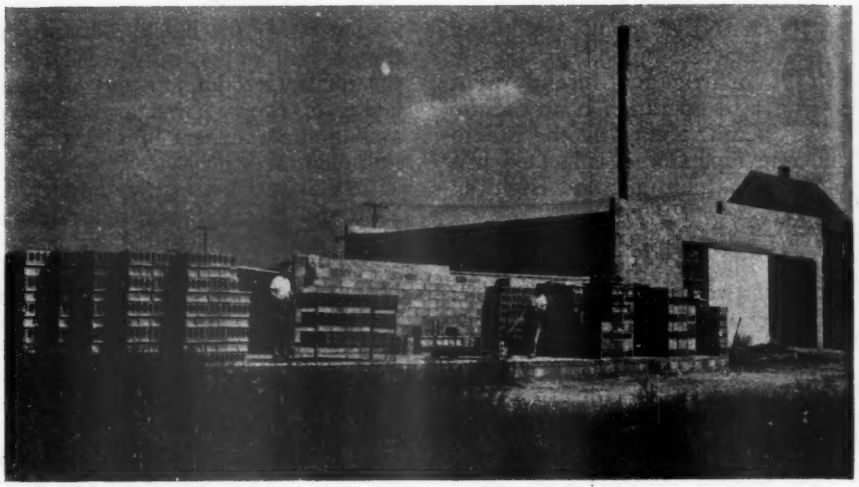
another ON THE SPOT report

A GOOD example of relatively high block production obtained with a moderate investment of capital is the Canton Concrete Products Company of Canton, O. This small concern, incorporated in January, 1946, started production

By WILLIAM M. AVERY

on Memorial Day of last year with only the bare necessities, but good management and careful planning have increased output to a respectable 3,000 equivalents per 16-hr. day.

Although the three owners (Harry O. Rollins, president, J. Lewis Kronsis, vice-president, and Russel E. Wilson, secretary-treasurer) had no prior experience in the concrete products business, they brought to their venture an unusual combination of mechanical know-how which has contributed much to the early success of the undertaking. Each of these men is a skilled machinist — a circumstance which has helped their enterprise over many of the early hurdles, and which promises to yield rich dividends in the overall efficiency and continuity of plant operations. For example, with three skilled mechanics at the helm there was no hesitation about undertaking two-shift operations on a single block machine, although many who have tried this practice under less promising auspices have found that delays of one kind or another can make serious inroads on the additional production sought.



• A general view of the new plant of the Canton Concrete Products Company, Canton, O.

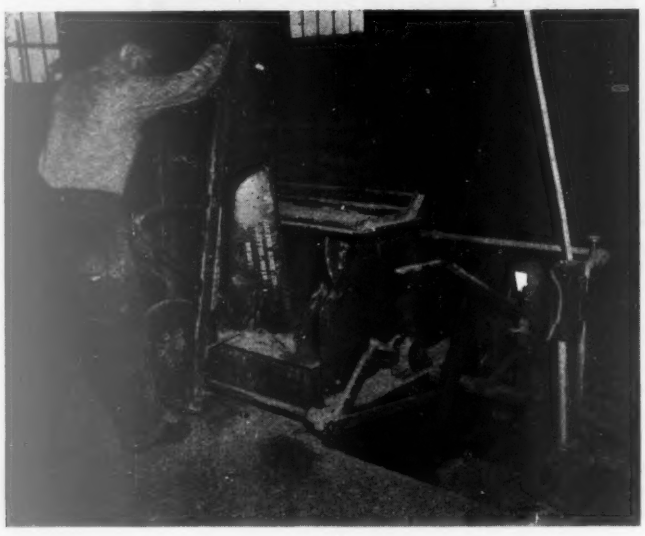
The Canton plant is housed in a 40- by 40-ft. concrete masonry building adjoining a bank of four 10- by 36-ft. curing rooms. Straight No. 7 slag (¼-in. down to dust), supplied by a plant only one-fourth of a mile away, is used to produce 8-in. standard units averaging 36 to 38 pounds in weight. At present some 50 or 60 tons of the aggregate is stored on the floor inside the building, but in the near future elevators, overhead bins and facilities for accurate batching will be installed.

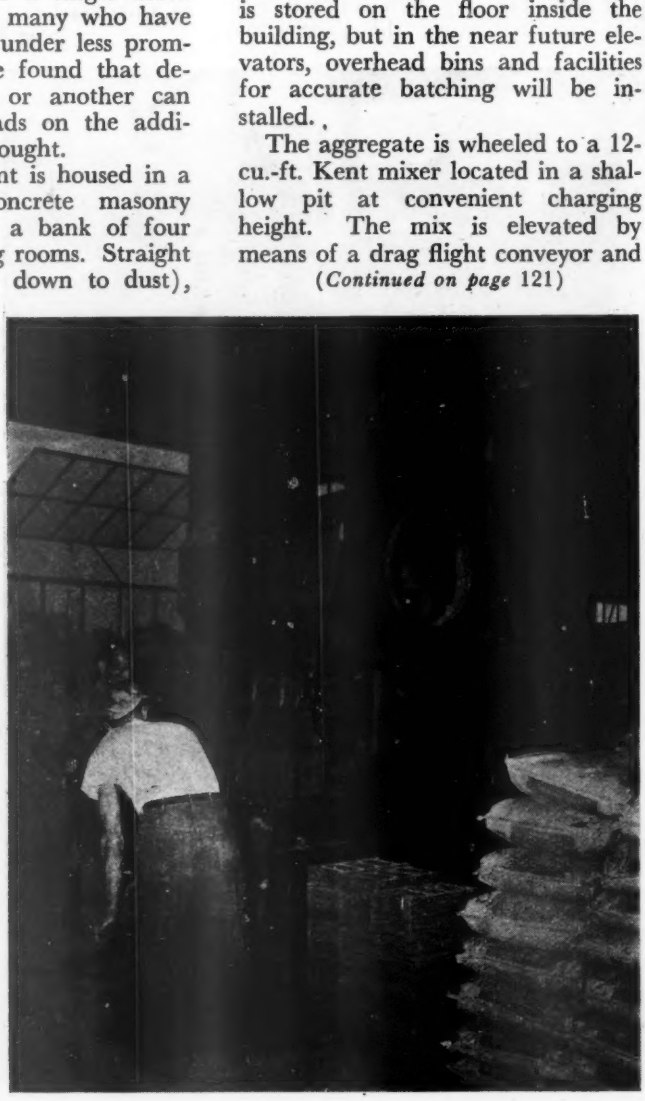
The aggregate is wheeled to a 12-cu.-ft. Kent mixer located in a shallow pit at convenient charging height. The mix is elevated by means of a drag flight conveyor and

(*Continued on page* 121)

• Below, left: The 12-cu.-ft. mixer, at present charged by wheelbarrow, will eventually be fed from overhead bins. (Air-entraining cement is stored beyond the mixer.)

• Right: Two-shift operation of this power tamper is giving the company a total daily output of almost 3,000 8-inch equivalents.





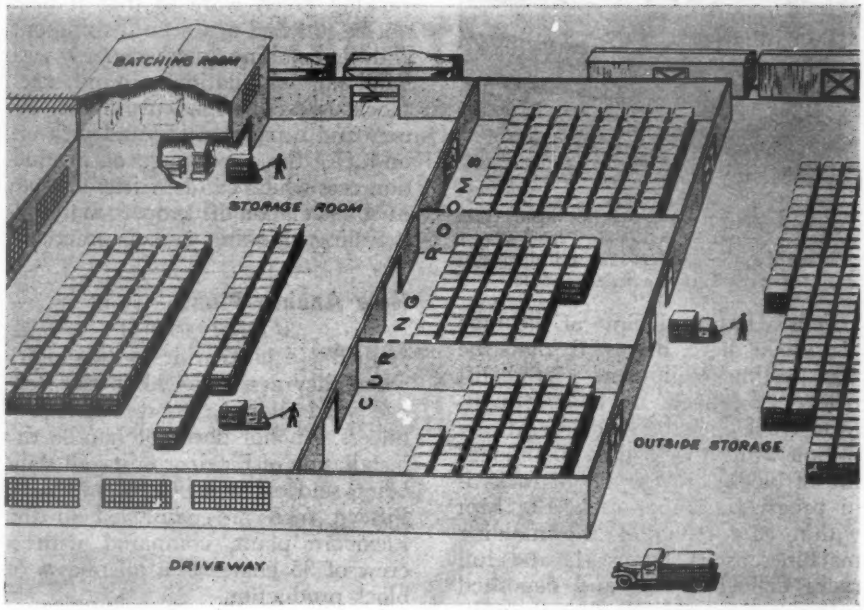
Concrete Masonry Blocks Require Special Materials Handling Logic

IT has been reliably estimated that, throughout industry, 30 percent of every production dollar is spent in simply picking up, moving, and putting down again the various materials, parts, equipment and assemblies involved in the manufacturing sequence. And the lower the cost of the raw materials and the processing, the more significant becomes the mere handling cost.

In the manufacture of building block, therefore, the percentage of the manufacturing dollar spent in lifting, toting, and placing is probably even higher. Accordingly, enormous opportunities for reducing cost —and thus increasing profit—lie in the improvement of building-block handling methods and the development of flow-systems for building-block plants which minimize manpower, confusion and delay.

In this review, techniques are discussed which represent the fruits of long experience by one leading manufacturer of mobile materials handling equipment in developing systems for producers of building block—and, therefore, can be construed as a recommendation for improved practice.

The drawing in Figure 1 diagrams the basic problems of materials handling peculiar to the building block industry. Note that the actual processing zone is a very small fraction of the total plant area, that the bulky product requires an uncommonly large amount of space at every step after molding.



• Fig. 1. A typical building-block plant layout, designed for maximum economy in materials handling.

In all but the largest building block operations, hand-drawn mechanical equipment is adequate. In certain plants, of about the size diagrammed, the hand-lift truck is replaced by the so-called "worksaver" which uses electric power both for lifting the load and for propelling the truck forward or backward—but is not designed for riding by the operator. He walks the load and steers it—but exerts no muscular effort to lift or haul.

In view of the usual not-too-good floor conditions in the building block industry, it is wise to select hand trucks or worksavers with large wheel diameters—large enough to ride over rough surfaces without trouble.

Also, building blocks are easily damaged by shock and vibration before they are fully cured. Therefore, it is wise to select trucks with such features as hydraulic release checks which cushion the descent of heavy loads, or even trucks with full-floating frames carried on springs. Both features prevent jar and shock from being transmitted to green blocks.

Figures 3 and 4 show different ways of "unitizing" the loads of block for maximum space conservation, top maneuverability, and adequate air circulation throughout curing rooms. In Figures 2 and 3 racks are used—either wooden or metal—with legs sufficiently high to admit the platforms of hand trucks or worksavers. In Figure 4 special stem-supported trays are carried on a skid-like structure, each tray carrying its quota of block.

Factors of maneuverability, such as turning-radius and grades traversed without "hanging up", should be considered both in the selection of trucks and in the design of the rack or frame.

• Fig. 2. The hand-truck-and-wooden-rack system permits the easiest maintenance and the least investment. Curing room floor space can be used to the best advantage.

• Fig. 3. In yard storage this hand truck with heavy-duty hydraulic load-release cushions the descending load and eliminates the hazard of the flying handle.

It is a basic principle of the type of system here discussed that the transporting equipment (hand lift truck, worksaver, or electric platform truck) not be held idle at any station while the loading or unloading of blocks onto or off of racks is in progress. Empty racks are kept within easy reach of the molding machine, as in Figure 4, and full racks delivered into and deposited within freight cars, so that the rolling equipment may be busy all the time at the function for which it is designed—movement.

Note also, in the case diagrammed in Figure 1, that two worksavers and one hand truck are adequate to do all the materials handling required in the operation—the hand truck being used only between molding press and temporary storage, the worksavers being used for the long hauls and the more precise maneuvering in curing zones and yard storage. The skid-racks themselves are home built in large quantity.

• Fig. 4. In large-scale block production, where distances traveled may be great, electric low-lift platform trucks are ideally suited. Note that the molding machine operator is the last to touch the block until the finished skid-load is delivered to the freight car many days later.

In summary, one should remember: (1) the fragility of the load in the green state, (2) the undesirability of selecting equipment which is not flexible (which can only perform one specialized function in one location), (3) the importance of racking green ware so that it need not be touched again until shipment, and yet combine space-economy with good air circulation around each block, (4) close maneuverability for easy and rapid spotting and pick-up, and (5) the percentage of production cost which can be frittered away in hand labor if proper materials handling thinking is not practiced.

New Anchor Plant

(*From page* 114)

"cubed" (4 units wide by two high) when they are removed to the storage yard. Unlike most other producers, Anchor does not handle the installation of Flexicor units, all slabs being sold on an F. O. B. job basis. Fifteen men are employed in the Flexicore plant, compared with a crew of 35 engaged in all phases of block production.

Future Plans Never one to rest long on his laurels, Fred Reinhold is already preparing plans for a complete testing and development laboratory to be erected adjacent to the new plant. In addition to equipment for carrying out all the standard tests for concrete masonry units, the laboratory will include facilities for curing units under a wide range of conditions. Present plans call for its completion sometime during the spring of 1948.

Equipment for crushing and screening cinder aggregate will be installed at the new plant as soon as possible. Until this change can be effected, cinder processing is being handled at the old William Street plant.

In addition to Mr. Reinhold, the officers of Anchor Concrete Products, Inc., are Louise M. Reinhold, vice-president, Harvey A. Lee, secretary, and William L. Schiesel, treasurer. Richard T. Carpenter is the company's chief engineer, and Raymond R. and Grant N. Reinhold are respectively superintendent and assistant superintendent. Roy Powell serves as chief dispatcher and is in charge of office sales.

At the formal opening of the new plant on June 21st, Mr. Reinhold plans to maintain a full operating schedule, and to present demonstrations of current practice in masonry work and painting. A buffet luncheon will be served to invited guests.

Labor Requirements

(*From page* 116)

pacity utilization in the plants in that area. This factor is significantly reflected in the man-hour requirements for the overhead and administrative functions. It should be noted that the plants, in the areas showing man-hour requirements below the average for all plants, were producing larger proportions of pipe in the smaller sizes, which permitted the use of pipe molding machines and did not require the extra employment for welding and placing the reinforcing steel necessary in the production of larger sizes. It can be observed that the average requirements for all areas except the Northeast, representing 31 of the 34 plants, are within the relatively narraw range from 4.00 to 4.74 man-hours per ton.

New California Plant

(*From page* 117)

stripping of the jackets. A skip-hoist elevates the concrete to a feed hopper above the Tampmaster. The hopper has steeply sloped sides to prevent the concrete from hanging up, and has a motor-driven, 12-paddle feeder in the bottom which starts turning the moment the operator presses the button which starts the machine operating.

Bicycle-wheel pipe carts, designed and built by the company, are used to carry the freshly-made pipe sections to the curing slabs where the forms are stripped and returned to the machine. A typical 8-hr. run yields from 900 to 1,100 lineal feet of 10- and 12-in. pipe. A minimum of 5 days curing under sprinklers and 5 additional days' air-curing in the yard is insisted upon before any of the units are declared ready for delivery and installation. A Scoopmobile equipped with adjustable

forks handles the cured pipe and loads the trucks.

Pipe-laying operations in the field are subcontracted to an experienced firm, the Pacific Pipeline Construction Co. of Los Angeles. Two field crews are usually at work.

Owners Skills

(*From page* 118)

discharged into the Kent power tamper block machine. Freshly-molded units are hand loaded into 42-block steel racks and transported to the curing rooms with a hydraulic Weld-Bilt lift truck. Steam is supplied to the rooms for a period of 12 hours after they are loaded. Doors at the back ends of the rooms permit the removal of cured units directly onto the shipping dock without interference with production in the main portion of the building.

After operating briefly with regular portland cement, the company tried a shipment of air-entraining and noted an immediate increase in 14-day compressive strength of the units from 600 p.s.i. with regular to 1,200 p.s.i. with Diamond air-entraining cement. Although the magnitude of this increase suggests strongly that there must have been other variables present, there is considerable evidence from many sources that air entrainment has a beneficial effect upon the compressive strength of concrete masonry units. This is a direct reversal of the effect of entrained air in monolithic concrete, in which some loss of strength is usually experienced.

• Racks are handled with this hydraulic lift truck.

The company's plans for the near future include the installation of a second Kent block machine and the replacement of the present 12-cu.-ft. mixer with a 25-cu.-ft. unit to service both block machines. Also contemplated is the erection of a 50- by 60-ft. building for the production of miscellaneous concrete products including burial vaults.

300 BLOCKS per HOUR

"Push-Button Cycle-Control"

• • WITH THE • •

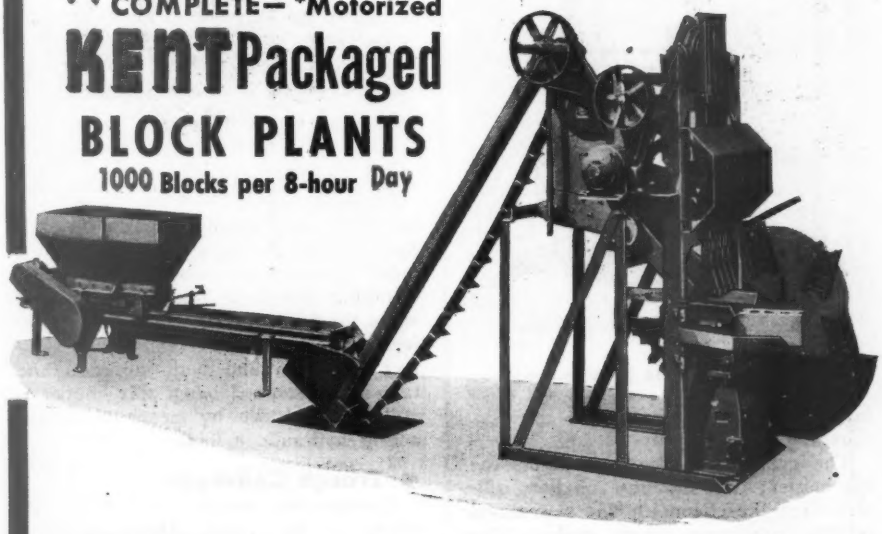
KENT VIBRA-TAMP

• A complete automatic cycle block maker combining vibration and tamping that responds to "PUSH-BUTTON CONTROL" and produces 300 quality blocks per hour. A rugged machine unexcelled in design, principle of operation and performance. Write for the illustrated Vibra-Tamp circular.

• • COMPLETE— *Motorized

KENT Packaged BLOCK PLANTS

1000 Blocks per 8-hour Day



• The KENT Continuous Mixer delivers well-mixed concrete in a steady stream to the KENT Elevator which raises it to the KENT Feeder. From this the concrete flows into the easily operated KENT Stripper. The pull of a lever brings the KENT Tamper into operation for speedy tamping of dense block. The hopper "strikes-off" the blocks smoothly. It is then raised by an easily operated lever and swung to one side on the "take-off". At the right of the stripper stands the KENT Dunker which keeps pallets constantly in fine condition. Furnished with 1000 pallets, 25 three-deck curing racks and lift truck.

*Larger KENT plants are available; also units for belt drive and combinations having the KENT Batch Mixer, instead of the Continuous Mixer. Use the coupon below to obtain any desired information quickly and easily.

The KENT MACHINE COMPANY

Manufacturers of CONCRETE PRODUCTS MACHINERY Since 1925

CUYAHOGA FALLS, OHIO, U.S.A.

Send complete information and prices as checked below.

☐ Plant illustrated above ☐ Plant with Batch Mixer

☐ Plant with belt drive ☐ Larger Complete Plants

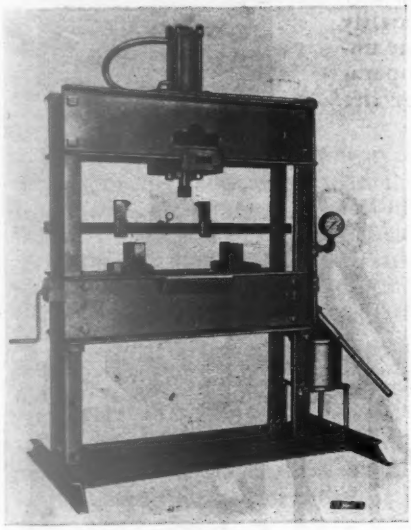
Name..... Address.....

P. & Q. City .....

NEW MACHINERY and SUPPLIES

● Hydraulic Press

Featured by Rodgers Hydraulic, Inc., 7411 Walker Street, St. Louis Park, Minneapolis, Minn., is the Rodgers "Sixty," a 60-ton shop press for pressing, shearing, bending, straightening, clamping and assembly.



For oversize jobs.

The cylinder is adjustable across the top bolster; it is mounted on four rollers riding the channel. The ram travel is 2½ inches per pump stroke. The cylinder is detachable for use as a jack, etc. With a 45-inch working space on the bolsters, large gears, wheels or pulleys can be accommodated. The opening between front and back bolsters is 10 inches.

The space between the top and bottom bolsters is adjustable from 8 inches to 38 inches and is regulated by a hand crank. At the right are the hydraulic gauge, marked in pounds and tons, and the valve. A two-speed, self-lubricating pump supplies the power for the press, which at high speed is capable of 2,000 p.s.i. The Sixty occupies floor space of only 38 by 70 inches.

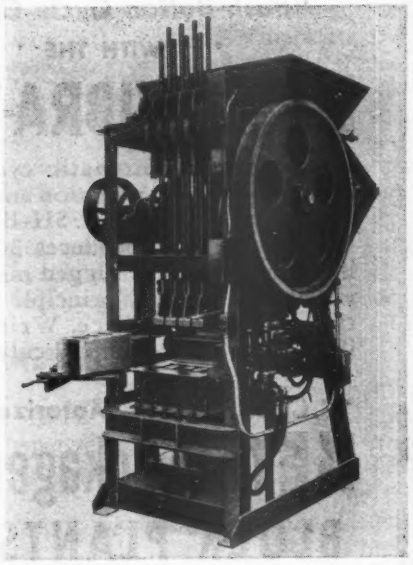
Also manufactured by the company are 100-ton and 150-ton presses and the Rodgers Portable Universal Press.

● Combination-Type Machine

An interesting addition to the concrete block machinery field is the ultra-modern Monroe automatic block machine manufactured by Dutton Machinery Equipment, 407 S. Dearborn St., Chicago 5, Ill., which combines mechanical tamping with Syntron mold vibration and hydraulic operative controls.

The tamping is variable according to the hand setting of a solenoid switch. Tampers are of the 8-bar type, each dropping independently of the other, thereby permitting better packing of the concrete. The machine can be furnished as a tamper only or in combination with mold vibration. The hydraulic controls form a part of either machine.

Mold vibration is accomplished by means of the Syntron electrical vibrators. Special mold mounting permits maximum mold response to vibration impulses. Tamping and mold vibration both start when the feed tray or hopper is brought forward through electrical contact. Contact is broken and both vibration and tamping is stopped when this hopper is rapidly withdrawn by means of a fast-acting hydraulic cylinder.



Uses mechanical and hydraulic controls.

● Trough Conveyor

Transporting concrete from ready mix trucks to the point of placement is economically accomplished through the use of a "Porta Conveyor," manufactured by the A. B. Farquhar Company, York, Pa.

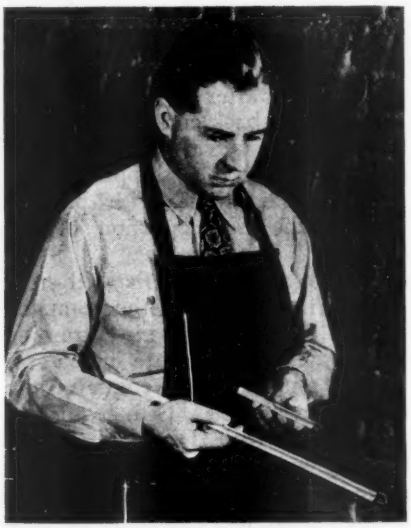
The model shown in the illustration is a Porta Trough Conveyor No. 343, which is made with belt ranging from 18 to 24 inches in width and 20 to 40 feet long. The vertical heights are adjustable over a 7 to 11 feet range for the 18 x 20 ft. units and from 12 to 21 ft. for larger conveyor.

Elevating ready-mix on the job.

● Long Masonry Drills

Extra length, carbide-tipped masonry drills for use in deep hole drilling of non-metallic materials, have been standardized by Super Tool Company, 21650 Hoover Road, Detroit, Michigan.

Drills up to 1½" in diameter and 20" in length can now be supplied "off-the-shelf," according to the announcement of the company.



Standardized drills.

Heretofore, it has been necessary to produce such masonry drills as special tools on special shop orders.

Also pointed out is that the extra length drills are fluted for chip clearance and heat dissipation the same as their regular lengths—a feature that has been proven necessary in this type of tool.

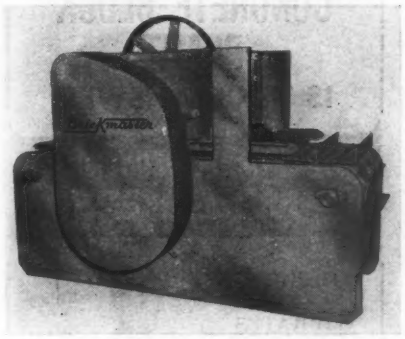
● Leak Stopper

"Flextite" is a liquid chemical which, when mixed with cement or cement and sand, stops leaks in concrete or masonry. It is claimed that a mix containing Flextite, can stop leaks against hydrostatic pressure. One gallon will cover approximately 150 to 175 square feet.

Manufactured by Flexrock Company, 3607 Cuthbert Street, Philadelphia 4, Pa.

● Rapid-Fire Brick Maker

A concrete brick machine, known as the "Brickmaster," reportedly produces 3,000 to 6,000 bricks per hour. Operating on either a 10-hp. electric motor or a 15-hp. gasoline motor, the 3,600-pound machine can be handled by two men.



A two-man machine.

Manufactured by Brickmaster, Inc., 115 Broadway, New York 6, N. Y.

● New Transit Mixer

R. G. LeTourneau, Inc., of Peoria, Ill., has developed a huge new transit mixer known as the "Tournamixer," designed for use in conjunction with the "Tournalayer," a machine used in the mass production of concrete houses.

The major components which comprise the Tournamixer are the main frame structure, the swing frame structure, the mixing drum, and the pulling unit, which is a two-wheeled rubber tired tractor. The big mixer can be moved over all types of terrain.

The howitzer-shaped drum mixes the concrete while rotating in one direction, and forces the concrete out at the end while turning in the other direction due to the corkscrew action of the blades. The 7-cu.-yd. machine weighs in the neighborhood of 30,000 pounds and measures 9 feet wide and approximately 45 feet long.

A Big Bertha traveling mixer.

● Fork Truck Pusher

The adaptation of a pushing device to a standard fork truck has been accomplished by the Tructractor Division, Clark Equipment Company of Battle Creek, Mich. Retainers are used to hold the pallet in the application illustrated, but other types of loads may be deposited with the pallet if desired.

If mounted on a fork truck, the pusher is retracted while the load is in place on the pallet for transporting. At the point of deposit the mechanism pushes the load off the pallet and is retracted.

The pusher device has a maximum stroke of 52 inches, a thrust capacity of 4,000 pounds and is available on the Clark Carloader and Utilitruc.

Pushing device in action.

● Masonry Sealer

A new substance called Agraseal has been perfected by The Tamms Silica Company, 228 N. La Salle St., Chicago 1, Ill. The product is designed to do a protective and sealing job on all porous masonry surfaces.

Agraseal can be applied with an ordinary scrub brush. When first applied, the material penetrates deep into the open pores. When it sets, a seal is established which it is claimed will withstand dampness, water, steam, alkali, sun, smoke, heat, cold, frost and ice.

FASTER CUTTING ...with Clipper Masonry Saws

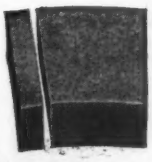
Your Special Size and Shape Brick or Concrete Block can now be "Tailor-Made" at a moment's notice!

The new Clipper Multiple Cutting Principle makes possible faster cutting of every masonry material regardless of hardness.

Here are a few typical examples of the speed and accuracy with which concrete products and fire brick can be cut.

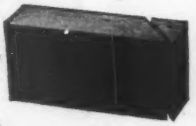
This concrete block, converted into a special size, was cut completely in two in 19 seconds.

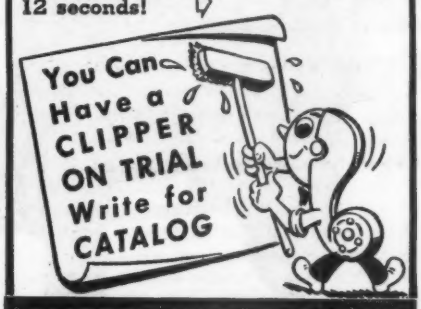
One of the many intricate cuts performed on first quality clay brick for heat treating furnaces —made in 8 sec.



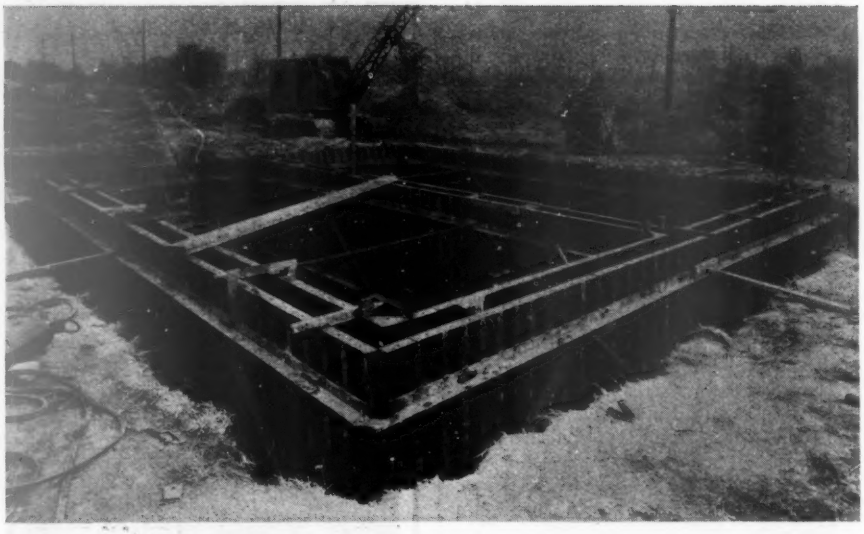
Rotary Kiln Blocks, cut to size for "key" bricks in rotary kilns, require only 10 sec. for completion of cut.

Basic refractories for steel furnaces or cement kilns must be accurately installed. This magnesite brick was cut in 12 seconds!





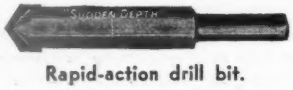
CLIPPER MFG. COMPANY
2801 Warwick, Kansas City 8, Mo.



Complete mold forms for house foundations like those shown above, known as Atlas Steel Speed Forms, have been developed by Concrete Forms Corporation, Irvington, N. Y. Units are built of lightweight steel and can be used repeatedly.

● Carboloy Drill Bit

A carboloy-tipped drill bit has been developed by the Paine Co., 2979 Carroll Ave., Chicago, Ill., which, it is said, will bite into masonry and concrete 50 to 75 percent faster than ordinary drills. The bit can be resharpened continuously without an independent cooling agent. Sizes range from 3/16 in. to 1½ in. Shank length can be varied over a wide range to allow for any depth of drill holes.



Rapid-action drill bit.

● Batch Weighing Unit

A new automatic weigh batching unit designed for use on ready-mixed concrete plants has been manufactured by The Conveyor Company of Los Angeles. The new "Conveyco" electronic weight con-

ARE LOW COST
PRECISION BLOCK
YOUR PROBLEM?
★
IF SO — THE
Western Air
AUTOMATIC CONCRETE BLOCK PLANT
IS YOUR ANSWER

AUTOMATICALLY CONTROLLED
NO LEVERS

COMPRESSES AND VIBRATES SIMULTANEOUSLY AND ACCURATELY

★

Contractors all over the country say they prefer the superior block made on this inexpensive compact machine.

★

WESTERN'S PRODUCTION CAPACITY

The Single .....1500 blocks per day
The Double .....2500 blocks per day
The Super .....4000 blocks per day
Priced from $890.00 to $3450.00

IMMEDIATE DELIVERY

Complete Plant equipment for the Block manufacturer (mixers, conveyors, hoppers, sturdy steel drying racks with 56 block capacity, lift trucks and drying room heating equipment).

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WEST COAST OFFICE
601 S. Vermont Av., Los Angeles, Cal.

300
QUALITY BLOCKS PER HOUR WITH THE GRAVELEY
BETTER-BUILT
CORONA
BLOCK MACHINE

● Sturdy
● Efficient
● Adaptable

There is one in operation near you . . . see it . . . before you buy.

OTHER GRAVELEY MACHINERY

- Four other complete plants, 125 to 800 blocks per hour.
- Concrete Mixers—6 to 28 cu. ft. capacities—or larger to your specifications.
- Hoppers • Conveyors • Lift Trucks
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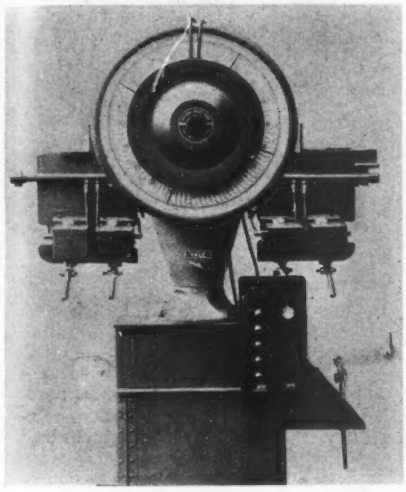
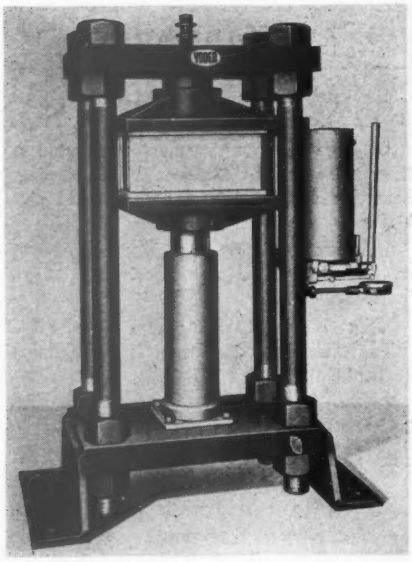
trol unit uses a dial scale with a single indicator hand and one photo-electric cell. The entire electrical system is located in a small removable panel on the base of the scale.

Adjustment of weights for each type of aggregate is made from the front of the dial. Once set, batching to these predetermined weights is done automatically. This model is adaptable to either semi-automatic batching or fully automatic operation.



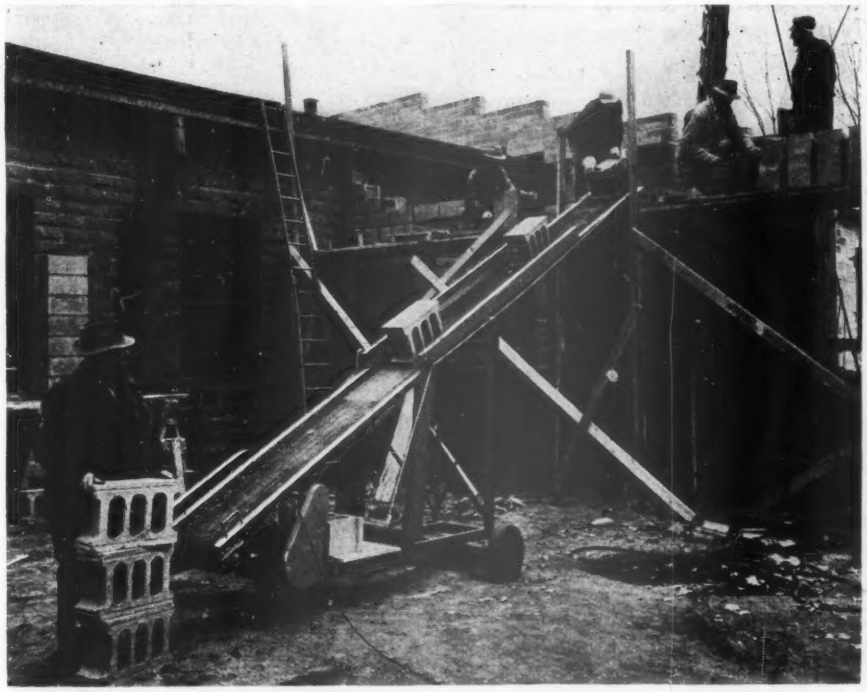
Automatic control.

The prevailing methods and types of equipment for producing ready-mixed concrete or concrete products can be found in the Concrete Industries Yearbook.



The Yoder Company, 5500 Walworth Ave., Cleveland, O., has developed a concrete block compression tester designed to meet the requirements of concrete block manufacturers who want a scientific method of checking the uniformity of their blocks. Dimensions are as follows: overall height, 5 feet; width, 4 feet; depth, 2 feet; approximate weight, one ton.

Operation of a ready-mix plant at Menominee, Mich., is scheduled to begin in the immediate future by the Limestone Products Company. The capacity of the new plant is to be 60 cubic yards of concrete per hour. The company will operate transit mix trucks of 6- and 3-cu.-yd. capacity.



A portable conveyor, the "Handipiler," manufactured by the Standard Conveyor Co., North St. Paul 9, Minn., here is elevating concrete blocks. The machine is equipped with rubber tires for transporting from job to job. It can lift material to a height of 15 feet. Power is supplied by either an electric motor or a gasoline engine. (See Pit and Quarry, July, 1946, p. 194, for another application of the Handipiler.)

CONCRETE BLOCK *Manufacturers*

IMMEDIATE DELIVERY ON JAY-BEE MIXERS!

MOTOR INCLUDED!

Rugged construction! Twin spiral mixing blades! High quality steel cut gears! Regulated discharge! Visible mixing! Job-tested design! 12 to 24 cu. ft. sizes. Other sizes to your specifications. ORDER NOW!

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323 West Martin St., Raleigh, N. C.

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Install [SC]2 PRECISION CONCRETE CONTROL **It Includes**

Moisture Meter

Makes a test for moisture content of fine or coarse aggregates in ONE minute. Accurate to ¼%.

Compensator

Delivers correct DRY weight of wet aggregates and ADDED water. Makes a graph record of EVERY BATCH.

[SC] CONTROL produces *uniform* concrete. Is always approved by concrete engineers. Has definite sales value. Write for our booklet "Profits in Concrete."

SCIENTIFIC CONCRETE SERVICE CORP.
724 Salem Avenue, Elizabeth 3, N. J.

Recognized Everywhere

The Hobbs Jr. Face-Down Block Machine is recognized everywhere as the great general purpose machine of the concrete-products industry. Famous for its wide range of sizes and the variety of blocks it can produce. As illustrated, it is equipped with striking and finishing device, shown under the floor-type tamper and with power feeder.

Stearns Clipper Stripper Machines; Stearns Jolterete Machines; Stearns Mixers; Cast Iron and Press Steel pallets. Straublox oscillating Attachments, etc. Repair parts for: Anchor, Stearns, Blystone Mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
1191 Fairview Ave. Columbus, Ohio.

Burton L. Goddard and William L. Tyerman, both veterans of World War II, have started the Imperial Concrete Tile Company at Imperial, Neb. The plant is located at the Chase County fairgrounds.

The Joliet Silo Company, a newly-organized firm of Joliet, Ill., has purchased the facilities formerly occupied by the Illinois Wire and Manufacturing Company in that city. The product of the new concern will be curved concrete blocks for the construction of farm silos.

TRADE LITERATURE

BESSER SUPER VIBRAPAC. 6 pages. Besser Manufacturing Co., Alpena, Mich.

GEORGE SUPER VIBRATOR CONCRETE BLOCK MACHINE. Folder. F. C. George Machine Co., 100 S. Westmoreland Dr., Orlando, Fla.

FLEXICORE FLOOR AND ROOF SLAB. 16 pages. The Flexicore Co., Inc., New York 17, N. Y.

THE KENT CONTINUOUS MIXER. 4 pages. The Kent Machine Co., Cuyahoga Falls, O.

LUMNITE FOR REFRACTORY CONCRETE. 24 pages. The Atlas Lumnite Cement Co., 135 E. 42nd Street, New York 17, N. Y.

CLARK TRUCLOADER. 24 pages. Vol. 4, No. 3. Clark Equipment Co., Battle Creek, Mich.

TIMELY TOPICS. Bulletin on treatment of concrete blocks for resistance to exposure and wear. Department of Industrial Research, L. Sonneborn Sons, Inc., New York.

ERICKSON POWER LIFT TRUCKS. 4 pages. Erickson Special Equipment Manufacturing Company, 1401 Marshall Street, N.E., Minneapolis 13, Minn.

LIFT YOUR MATERIALS HANDLING PROBLEMS WITH THE PALLETIER. 4 pages. Crescent Truck Company, Lebanon, Pa.

ATLAS SPEED CONCRETE PIPE FORMS. 4 pages. Atlas Steel Construction Company, Irvington, N. Y.

BROOKS LOAD LUGGER. Catalog No. 1-A. Brooks Equipment and Manufacturing Company, Knoxville, Tenn.

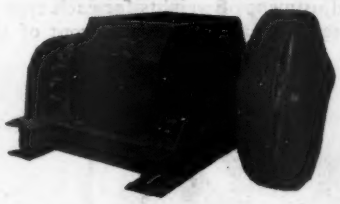
CLARK TRUCLOADER METHOD. 14 pages. Clark Tructractor, Division of Clark Equipment Company, Battle Creek, Mich.

MORE TRIPS PER DAY. Bulletin No. 46-8. 19 pages. Chain Belt Company of Milwaukee.

ATLAS STEEL FORMS FOR CONCRETE CONSTRUCTION. 8 pages. Atlas Steel Construction Company, Irvington-on-Hudson, N. Y.

ATLAS LABOR-SAVING SPEED FORMS. 4 pages. Irvington Form & Tank Corporation, 43 Cedar St., New York, N. Y.

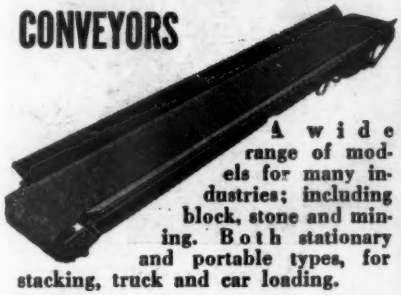
CINDER CRUSHERS
FOR BLOCK MAKERS



7 DAY DELIVERY

10 to 25 ton per hour capacity **$395** 25 to 50 ton per hour capacity **$895**

CONVEYORS



A wide range of models for many industries; including block, stone and mining. Both stationary and portable types, for stacking, truck and car loading.

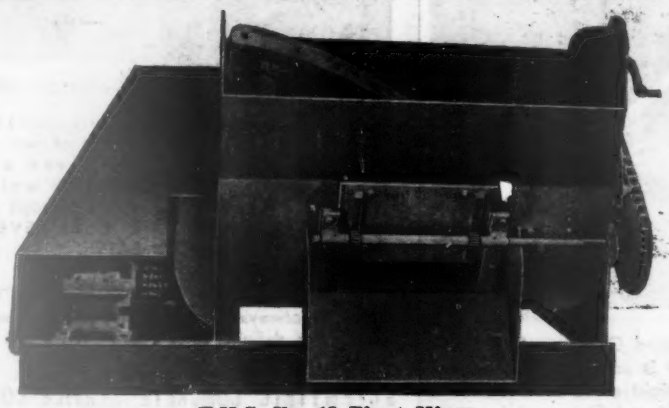
BONDED SCALE CO.
129 Bellview Ave.
Columbus 7, Ohio

Manufacturers of Scales, Crushers, Conveyors and Vibrating Screens

TRADE NOTES

The F. C. George Matchinery Co. of Orlando, Fla., has established a branch at 5609 Yale Blvd., Dallas, Tex., with William M. Mack in charge as district sales manager. The Florida concern manufactures and sells machinery for the production of concrete building blocks, as well as lift trucks and pallets used for moving the blocks.

Richard L. LeTourneau has been appointed manager of the newly created Tournalayer Sales Division of R. G. LeTourneau, Inc. His office will be in Longview, Tex.

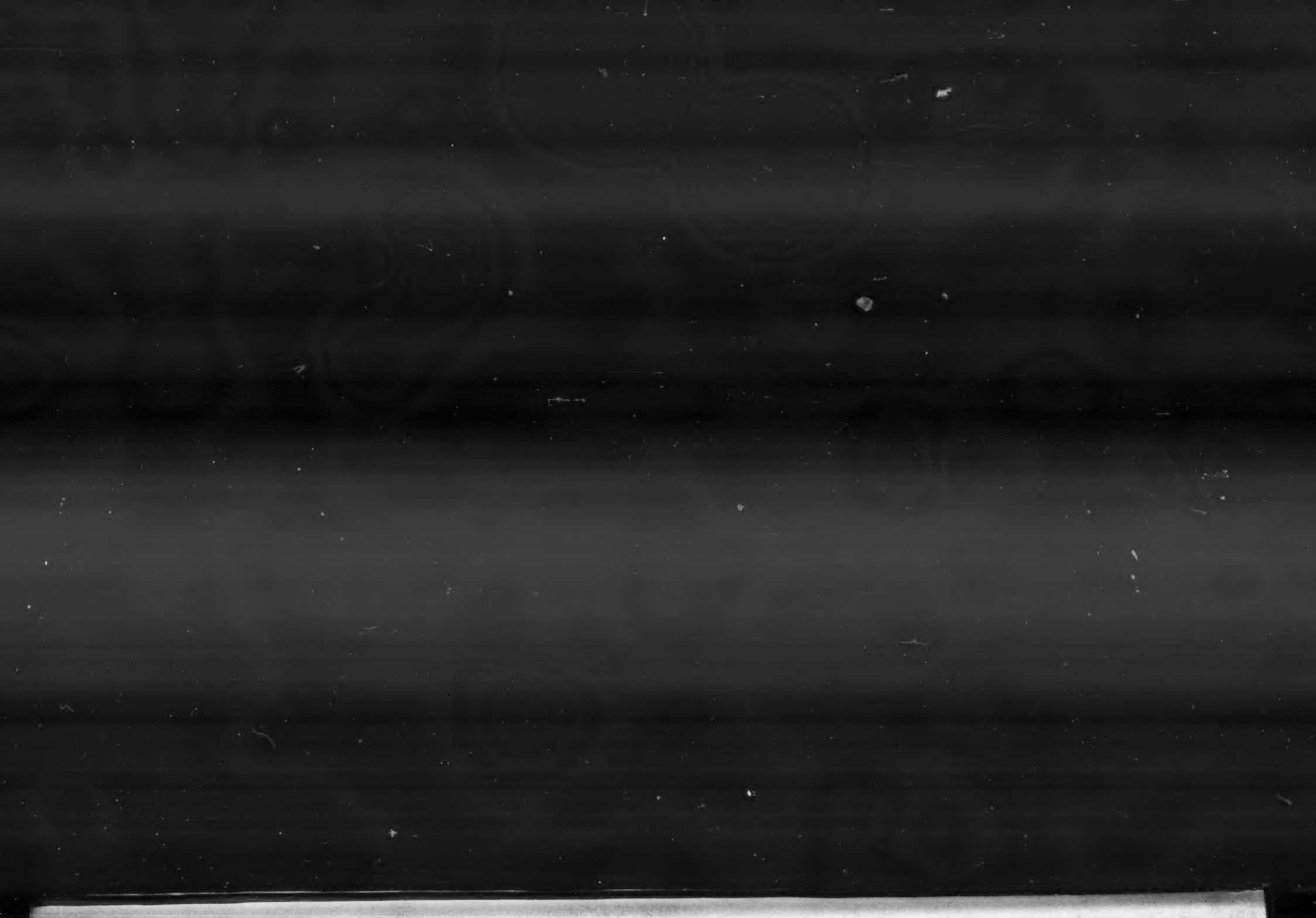


F.M.C. No. 12 Plant Mixer

Why Settle For Less—The Best Is Available

Compare These Specifications with Any Mixer on the Market

Roller Bearings - Alloy Steel Shafting - Welded Construction - Fully Enclosed Gear Reduction Units - Interchangeable and Replaceable Liner Plates - Replaceable Abrasion Resisting Rubber Inserts in Helical Mixing Blades - Chain and Sprocket Controlled Discharge Door.

See Us For Complete Concrete Block Plant Machinery

Fleming Manufacturing Co., Inc.
4989 Fyler Ave. Flanders 7800 St. Louis 9, Mo.